

## DESCRIPTION

## SKIN TREATMENT COMPOSITION FOR WRINKLE REDUCTION

## 5 TECHNICAL FIELD

[0001]

The present invention relates to a skin treatment composition for wrinkle reduction. More specifically, it relates to a skin treatment composition that reduces skin wrinkles by means of a film formed as said skin treatment composition dries after being applied on the skin.

## BACKGROUND ART

15 [0002]

Conventionally, film agents have been used for a skin treatment composition for the purpose of reducing skin wrinkles. A film agent is used because the film shrinks as it dries; the idea is to pull small skin wrinkles with the film-forming contractile force to increase the tension and thus temporarily remove the small wrinkles. For this reason, film agents that have a strong contractile force and form a hard film have been used.

25 [0003]

Known film agents that are blended into a wrinkle reducing agent using such strongly contracting polymers include, for example, polyurethane (see Patent Document 1); also,

5 research has been done to study wrinkle reduction by means of formation of a film having a strong contractile force by using film-forming polymers such as acrylic resins, vinyl acetate resins, polyethylene resins, silicone resins, polyvinyl  
10 resins, polyvinyl alcohol, acrylic water soluble resins, cellulose water soluble resins, starch and its derivatives, gelatin, and sodium alginate (see Patent Document 2, for example).

[0004]

15 However, when a film agent having a strong contractile force is used, there are problems in that the wrinkle reduction effect is very limited and usability and the sensation during use are poor; this is because as the film agent contracts  
20 its adhesion to the skin weakens and it peels off easily from the skin, which is more elastic, and also because hardness of the film causes discomfort during use, premature breakage of the film, and glossy skin.

25 [0005]

Patent Document 1: Japanese Patent Laid-Open  
H11-504949 bulletin

Patent Document 2: Japanese Patent Laid-Open  
H5-933 bulletin

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#### DISCLOSURE OF INVENTION

[Problem that the present invention aims to solve]  
[0006]

The present invention has been carried out  
10 in view of the situation described above, and its  
object is to provide a skin treatment composition  
for wrinkle reduction that is superior in terms of  
the wrinkle reduction effect, usability, and the  
sensation during use.

15 [Means to solve the Problem]  
[0007]

[Invention of claims 1-12]

The inventors conducted earnest research and  
discovered that the aforementioned problems can be  
20 solved by preparing a skin treatment composition  
by blending a water dispersion of a specific  
polymer, specifically polyurethane and an acrylic  
type polymer, that forms a film having a weak  
contractile force, thus completing the present  
25 invention.

[0008]

The present invention is not based on the idea of using a conventional contracting film; on the contrary, it is based on the idea of 'filling wrinkles with film.' That is, polyurethane and acrylic type polymers are used to obtain a new skin treatment composition for wrinkle reduction having superior functions than those conventionally known using an action mechanism different from those conventionally known: the skin treatment composition for wrinkle reduction of the present invention is applied on the skin to form a film on the skin that does not contract or become hard like the conventional ones.

15 [0009]

That is, the present invention is a skin treatment composition having a water dispersion of a polymer in which a non-water soluble film-forming polymer is dispersed in water wherein the main ingredients of said film-forming polymer are polyurethane having a film shrinkage rate of 20% or less and an acrylic type polymer having a film shrinkage rate of 20% or less.

[0010]

25 Said film-forming polymer is a polymer that

forms a film on the skin or substrate when a water dispersion of it is applied on the skin or substrate and dried.

[0011]

5           Said polyurethane is preferably polyurethane obtained by reacting an isocyanate compound and a diol compound containing a polyether diol, polycarbonate diol, and alkylene diol containing a carboxyl group; for said isocyanate compound it is  
10 preferable to contain isophorone diisocyanate.

[0012]

          Furthermore, in said preferable polyurethane, the polyether diol is preferably  
polytetramethylene glycol, the polycarbonate diol  
15 is preferably polyhexamethylene carbonate diol, and the alkylene diol containing a carboxyl group is preferably dimethylolpropionic acid and/or dimethylolbutanoic acid.

[0013]

20           Said acrylic type polymer is preferably a polymer of monomers whose main ingredient is ethyl acrylate.

[0014]

          Furthermore, it is preferable for the water  
25 dispersion of the acrylic type polymer to contain

sulfonated polyvinyl alcohol.

[0015]

Also, in the present invention, the film strength of said polyurethane is preferably 300-  
5 700 kg/cm<sup>2</sup>, and the film strength of the acrylic type polymer is preferably 0.1-100 kg/cm<sup>2</sup>.

[0016]

The film elongation of the polyurethane is preferably 200-500%, and the film elongation of  
10 the acrylic type polymer is preferably 500-2000%.

[0017]

Also, the average particle size of the polyurethane in said water dispersion of  
polyurethane is preferably 10-300 nm, and the  
15 average particle size of the acrylic type polymer in said water dispersion of acrylic type polymer is preferably 100-600 nm.

[0018]

In the present invention, the polyurethane  
20 in the water dispersion of polyurethane preferably is a mixture of particles having an average particle size of 20-60 nm and particles having an average particle size of 150-200 nm.

[0019]

25 The skin treatment composition for wrinkle

reduction of the present invention preferably contains the polyurethane to 1-10 wt% of the total weight of the skin treatment composition and the acrylic type polymer to 1-20 wt% of the total weight of the skin treatment composition.

[0020]

The present invention can also contain scaly silica. By adding scaly silica, the film formed by the water dispersion of the polymer becomes thicker and the wrinkle reduction effect is augmented and reinforced and thus a skin treatment composition for wrinkle reduction that can accommodate the elasticity and movement of the skin for a long duration of time can be obtained.

[0021]

The contractile force in the present invention is a force with which the water dispersion of the polymer contracts when it forms a film, and this force is evaluated based on the film shrinkage rate. The film shrinkage rate is a degree of contraction of the film relative to the thin layer of the original water dispersion when said thin layer of the polymer water dispersion is dried to form the film. Specifically, a water dispersion of a solid equivalent 1 g of the

polymer is poured into a 5 cm x 5 cm polyethylene mold such that the film thickness is approximately 0.5 mm and dried at a prescribed temperature (50°C) for a prescribed amount of time (three days at room temperature) to obtain a film, and the vertical height and horizontal length of this film are measured and used in the following formula for calculation.

[0022]

10            Film shrinkage rate (%) = [(Vertical measurement x Horizontal measurement)/25] x 100

[0023]

15            The film strength and the film elongation of the polymer is the strength and elongation of the film obtained by drying the thin layer of the water dispersion of the polymer; specifically, a water dispersion of a solid equivalent 1 g of the polymer is poured into a 5 cm x 5 cm polyethylene mold such that the film thickness is approximately 0.5 mm and dried at a prescribed temperature (50°C) for a prescribed amount of time (three days at room temperature) to obtain a film, and this film is cut out using a dumbbell #3 and the autograph function of "Tensile tester RTM-250" from Orientec Co., Ltd. is used to carry out the

20

25



measurement at 20°C and a cross head speed of 300 mm/min.

[0024]

[Invention of claims 13-25]

5           The inventors conducted earnest research to solve the aforementioned problems and discovered that the aforementioned problems can be solved by preparing a skin treatment composition by blending in a non-emulsifying type cross-linked silicone  
10 and polyurethane that forms a film having a weak contractile force, thus completing the present invention.

[0025]

          The present invention is not based on the  
15 idea of using a conventional contracting film; on the contrary, it is based on the idea of using a paste-like material that can change its form freely according to the wrinkle site and non-  
contracting film, thus 'filling wrinkles with  
20 film'. That is, a non-emulsifying type free-form cross-linked silicone and polyurethane, as a non-  
contracting film agent, are used to obtain a new skin treatment composition for wrinkle reduction having superior functions than those  
25 conventionally known using an action mechanism

different from those conventionally known.

[0026]

That is, the present invention is a skin treatment composition for wrinkle reduction comprising (a) a non-emulsification type cross-linked silicone, (b) a film forming polymer having a film shrinkage rate of 20% or less containing as a main ingredient a polyurethane having a film shrinkage rate of 20%, (c) a liquid oil component, and (d) water.

[0027]

Said film-forming polymer is a polymer that forms a film on the skin or substrate when a water dispersion of it is applied on the skin or substrate and dried.

[0028]

Said non-emulsification type cross-linked silicone is preferably one, two, or more chosen from a group consisting of a cross polymer derived from a reaction between methyl hydrogen polysiloxane and methyl vinyl polysiloxane, a cross polymer derived from a reaction between a partial long chain alkylated methyl hydrogen polysiloxane and methyl vinyl polysiloxane, and a cross polymer derived from a reaction between

methyl hydrogen polysiloxane and alkene.

[0029]

The long chain alkyl of said partial long chain alkylated methyl hydrogen polysiloxane  
5 should preferably have 10-14 carbon atoms.

[0030]

The non-emulsifying type cross-linked silicone should preferably be added as it is swollen with the liquid oil component.

10 [0031]

Said polyurethane is preferably polyurethane obtained by reacting an isocyanate compound and a diol compound containing a polyether diol, polycarbonate diol, and alkylene diol containing a  
15 carboxyl group; said isocyanate compound preferably contains isophorone diisocyanate.

[0032]

Furthermore, in said preferable polyurethane, the polyether diol is preferably  
20 polytetramethylene glycol, the polycarbonate diol is preferably polyhexamethylene carbonate diol, and the alkylene diol containing a carboxyl group is preferably dimethylolpropionic acid and/or dimethylolbutanoic acid.

25 [0033]

Also, in the present invention, the film strength of said polyurethane is preferably 300-700 kg/cm<sup>2</sup>.

[0034]

5        The film elongation of the polyurethane is preferably 200-500%.

[0035]

      Said film forming polymer having a film shrinkage rate of 20% or less containing as a main  
10 ingredient a polyurethane having a film shrinkage rate of 20% is preferably added in the form of a water dispersion.

[0036]

      The average particle size of the  
15 polyurethane in said water dispersion of polyurethane is preferably 10-300 nm.

[0037]

      In the present invention, the polyurethane in said water dispersion of polyurethane is  
20 preferably a mixture of particles having an average particle size of 20-60 nm and particles having an average particle size of 150-200 nm.

[0038]

      The skin treatment composition for wrinkle  
25 reduction of the present invention preferably

contains the non-emulsifying type cross-linked  
silicone to 0.5-5.0 wt% of the total amount of the  
skin treatment composition, and the polyurethane  
having a film shrinkage rate of 20% or less to  
5 0.1-10.0 wt% of the total amount of the skin  
treatment composition.

[0039]

The contractile force in the present  
invention is a force with which the water  
10 dispersion of the polymer contracts when it forms  
a film, and this force is evaluated based on the  
film shrinkage rate. The film shrinkage rate is a  
degree of contraction of the film relative to the  
thin layer of the original water dispersion when  
15 said thin layer of the polymer water dispersion is  
dried to form the film. Specifically, a water  
dispersion of a solid equivalent 1 g of the  
polymer is poured into a 5 cm x 5 cm polyethylene  
mold such that the film thickness is approximately  
20 0.5 mm and dried at a prescribed temperature  
(50°C) for a prescribed amount of time (three days  
at room temperature) to obtain a film, and the  
vertical height and horizontal length of this film  
are measured and used in the following formula for  
25 calculation.

[0040]

Film shrinkage rate (%) = [(Vertical measurement x Horizontal measurement)/25] x 100

[0041]

5           The film strength and the film elongation of the polymer is a strength and elongation of the film obtained by drying a thin layer of the water dispersion of the polymer; specifically, a water dispersion of a solid equivalent 1 g of the  
10 polymer is poured into a 5 cm x 5 cm polyethylene mold such that the film thickness is approximately 0.5 mm and dried at a prescribed temperature (50°C) for a prescribed amount of time (three days at room temperature) to obtain a film, and this  
15 film is cut out using a dumbbell #3 and the autograph function of "Tensile tester RTM-250" from Orientec Co., Ltd. is used to carry out the measurement at 20°C and a cross head speed of 300 mm/min.

20 [Effects of the invention]

[0042]

The skin treatment composition for wrinkle reduction of the present invention is not sticky and at the same time soft, supple, elastic, and  
25 flexible; it does not crack or peel off; it

adheres well to the skin and gives a light tactile sensation without discomfort; it can be worn for a long duration of time with ease and maintain a state of removing even small wrinkles for a long  
5 duration of time (i.e. the wrinkle reduction effect lasts for a long duration of time); it therefore exhibits a wrinkle reduction effect that hasn't been known conventionally.

[0043]

10 Furthermore, this effect is augmented and reinforced by adding scaly silica, resulting in an exceptional wrinkle reduction effect. In particular, the film formed by the water dispersion of the polymer becomes thick and the  
15 wrinkle reduction effect is augmented and reinforced and thus a skin treatment composition for wrinkle reduction that can accommodate the elasticity and movement of the skin for a long duration of time can be obtained.

20

BEST MODE FOR CARRYING OUT THE INVENTION

[0044]

[Invention of claims 1-12]

The best embodiments of the present  
25 invention are described in detail below.

[0045]

The skin treatment composition for wrinkle reduction of the present invention contains a water dispersion of a polymer in which a water-insoluble film forming polymer is dispersed in  
5 water, and the main ingredients of said film forming polymer are polyurethane having a film shrinkage rate of 20% or less and an acrylic type polymer having a film shrinkage rate of 20% or  
10 less. The film shrinkage rate is defined as described above.

[0046]

Those for which said film shrinkage rate is over 20% have a poor wrinkle reduction effect,  
15 peel off the skin, cause noticeable "gloss", and exhibit poor usability due to discomfort; therefore they cannot manifest the effects of the present invention. The preferable range of the film shrinkage rate is 10% or less. The lower  
20 limit of the film shrinkage rate is 0, i.e. no shrinkage, which is preferable; however, 5% is sufficient and also practical. That is, the film shrinkage rate in the present invention is 0-20%; within this range, preferable combinations of the  
25 upper and lower limits are used, examples include



5-20%, 0-10%, and 5-10%.

[0047]

In the present invention, as described above,  
a water dispersion of polyurethane, in which non-  
5 water-soluble polyurethane is dispersed in water,  
is used; said water dispersion is applied on the  
skin or substrate and as it is dried a  
polyurethane film is formed on the skin or  
substrate.

10 [0048]

The polyurethane used in the present  
invention is a polymer having urethane bonds; the  
urethane bond is formed by an addition reaction  
between an isocyanate group and a compound having  
15 active hydrogen, such as a hydroxyl group. The  
polyurethane in the present invention is  
preferably obtained with a conventional method  
reacting at least (A) an isocyanate compound  
having two isocyanate groups and (B) a diol  
20 compound having two hydroxyl groups.

[0049]

Selection of said isocyanate compound  
(ingredient A) is not limited in particular as  
long as it is used in conventional polyurethane  
25 manufacturing, examples include organic

diisocyanate compounds such as aliphatic  
diisocyanate compounds, alicyclic isocyanate  
compounds, and aromatic diisocyanate compounds.  
More preferable are aliphatic diisocyanate  
5 compounds and alicyclic diisocyanate compounds.  
One, two or more isocyanate compounds are freely  
selected and used.

[0050]

Examples of said aliphatic diisocyanate  
10 compounds include ethylene diisocyanate, 2,2,4-  
trimethylhexamethylene diisocyanate, and 1,6-  
hexamethylene diisocyanate.

[0051]

Examples of said alicyclic diisocyanate  
15 compounds include hydrogenated 4,4'-  
diphenylmethane diisocyanate, 1,4-cyclohexane  
diisocyanate, methylcyclohexylene diisocyanate,  
isophorone diisocyanate (hereafter referred to as  
"IPDI"), and norbornane diisocyanate.

20 [0052]

Examples of said aromatic diisocyanate  
compound include 4,4'-diphenylmethane diisocyanate,  
xylylene diisocyanate, toluene diisocyanate, and  
naphthalene diisocyanate.

25 [0053]

Of the specific examples of said isocyanate compound (ingredient A), 1,6-hexamethylene diisocyanate, IPDI, and norbornane diisocyanate are preferable due to superior weather resistance and availability. IPDI is particularly preferable.  
[0054]

Selection of said diol compound (ingredient B) is not limited in particular as long as it is used in conventional polyurethane manufacturing, preferable examples include an alkylene diol, carboxyl group-containing alkyl diol, alicyclic diol, spiro diol, polyester diol, polyether diol, polycarbonate diol, polybutadiene diol, polyisoprene diol, and polyolefin diol. Of these, particularly preferably used are an alkylene diol, carboxyl group-containing alkylene diol, alicyclic diol, polyether diol, and polycarbonate diol. One, two or more diol compounds are freely selected and used.

[0055]

Examples of said alkylene diol include ethylene glycol, propylene glycol, 1,4-butanediol, 1,6-hexanediol, neopentyl glycol, 1,8-octanediol, and 1,10-decanediol.

[0056]

Preferable examples of said carboxyl group-containing alkylene diol include carboxylic acids having 3-26 carbons, more preferably 3-12 carbons, as well as having a dialylol groups, such as  
5 dimethylol, diethanol and propanol. Specific examples include dimethylol propionic acid (hereafter "DMPA") and dimethylol butanoic acid (hereafter "DMBA"); a mixture thereof can be used as well.

10 [0057]

Examples of said alicyclic diol include 1,4-cyclohexane dimethanol (hereafter "CHDM"), which is preferable because it gives adequate strength to the film.

15 [0058]

Preferable examples of said spiro diol include spiro glycol.

[0059]

Examples of said polyester diol include  
20 those obtained by condensation polymerization between at least one chosen from a group of dicarboxylic acids including succinic acid, glutaric acid, adipic acid, sebacic acid, azelaic acid, maleic acid, fumaric acid, phthalic acid,  
25 and terephthalic acid and at least one chosen from

a group of diols including ethylene glycol, propylene glycol, 1,4-butane diol, 1,6-hexane diol, neopentyl glycol, 1,8-octane diol, 1,10-decane diol, diethylene glycol, polyethylene glycol (hereafter "PEG"), polypropylene glycol (hereafter "PPG"), tetramethylene glycol, polytetramethylene glycol, and spiro glycol, as well as those obtained by the ring opening polymerization of lactonic acid.

10 [0060]

Examples of said polyether diol include polyether diol contained in diol used in synthesis of said polyester diol, examples of which include a polyoxyethylene diol such as diethylene glycol and PEG, a polyoxypropylene diol such as PPG, a polyoxytetramethylene diol such as polytetramethylene glycol (hereafter "PTMG"), phenols such as bisphenol A, and a product of the ring opening addition polymerization of bisphenol A and at least one compound chosen from propylene oxide (hereafter "PO") and ethylene oxide (hereafter "EO") (if a copolymer is used, such a copolymer can be either a block copolymer or random copolymer). Of these, PEG, PPG, and PTMG are preferable, and PTMG is particularly

preferable since it forms a soft film and adheres to the skin very well.

[0061]

Preferable examples of said polycarbonate diol include polyhexamethylene carbonate diol (hereafter "PHMC") because of its ability to form a soft film and its superior adhesion to the skin.

[0062]

In the present invention, polyurethane that forms a superior film can be obtained by using the diol compound (ingredient B) consisting of a mixture of a polyether diol, polycarbonate diol, and carboxyl group-containing alkylene diol.

[0063]

In the present invention, when a carboxyl group-containing alkylene diol is used for the diol compound in the synthesis to obtain polyurethane containing carboxyl groups in the molecule, the carboxyl groups incorporated in the molecule can be neutralized by neutralizers such as triethylamine, trimethylamine, 2-amino-2-methyl-1-propanol, triethanolamine, potassium hydroxide, and sodium hydroxide to obtain a stable water dispersion of polyurethane.

[0064]

In the present invention, when mixing a polyether diol, polycarbonate diol, and carboxyl group-containing alkylene diol, it is particularly preferable to use PTMG for said polyether diol, PHMC for the polycarbonate diol, and DMPA and/or DMBA for said carboxyl group-containing alkylene diol.

[0065]

In the present invention, when using these preferable diol compounds, it is particularly preferable to use an isocyanate compound that contains IPDI; a skin treatment composition for wrinkle reduction having an exceptional wrinkle reduction effect can be obtained by using polyurethane synthesized by using IPDI for the isocyanate and PTMG, PHMC, DMPA and/or DMBA for the diol compounds.

[0066]

The molar ratio of said isocyanate compound (ingredient A) and diol compound (ingredient B) is preferably  $A/B = 2/0.8-2/1.8$ , and more preferably  $A/B = 2/1-2/1.8$ .

[0067]

In the present invention, it is preferable to use polyurethane having structural units

derived from alkylene oxide (R0); this makes it easier to control the elongation of the film obtained from the water dispersion of the polyurethane to obtain a flexible film. A skin treatment composition that manifests superior effects and superior usability can be obtained by using this polyurethane for the preparation.

[0068]

Examples of the compound having a structural unit derived from R0 include a polyoxyethylene diol such as diethylene glycol and PEG, a polyoxypropylene diol such as PPG, a polyoxytetramethylene diol such as PTMG, polyoxyethylene polyoxypropylene glycol (EO/P0 block copolymer), phenols such as bisphenol A, and a product of the ring opening addition polymerization of bisphenol A and at least one compound chosen from P0 and EO (if a copolymer is used, such a copolymer can be either a block copolymer or random copolymer); preferably used are PEG, PPG, PTMG, etc.

[0069]

In the present invention, the compound having a structural unit derived from R0 is used as a polyether diol ingredient in said ingredient



B.

[0070]

The water dispersion of polyurethane is prepared with a conventional method; for example,  
5 a pre-polymer having remaining isocyanate obtained from a reaction in an organic solvent is dispersed in water containing potassium hydroxide under high speed agitation, followed by a chain elongation reaction to increase the molecular weight, and  
10 said organic solvent is recovered from the obtained water based solution to obtain the water dispersion of the polyurethane.

[0071]

In the present invention, the following is  
15 particularly preferable for said polyurethane and water dispersion of polyurethane. That is:

[0072]

With regard to the film characteristics of the polyurethane, the strength is  $300-700 \text{ kg/cm}^2$ ,  
20 and preferably  $400-600 \text{ kg/cm}^2$ . If the strength is less than  $300 \text{ kg/cm}^2$ , then the film cannot follow the skin movements and peeling easily occurs. If it is over  $700 \text{ kg/cm}^2$ , then the film causes discomfort on the skin. The elongation is 200-  
25 500%, preferably 300-500%. If the elongation is

less than 200%, then the film formed on the skin cannot follow the skin movements very well. If it is over 500%, then the wrinkle reduction effect becomes insufficient.

5 [0073]

The average particle size of the polyurethane in the water dispersion of the polyurethane is 10-300 nm, preferably 20-200 nm. If the average particle size is less than 10 nm, then there is a sufficient small-wrinkle reduction effect but on the other hand the large-wrinkle reduction effect becomes insufficient. If the average particle size is over 300 nm, then adhesion to the skin becomes poor and peeling tends to occur.

[0074]

A preferable embodiment in the present invention uses two kinds of water dispersions of polyurethane having different particle sizes. This way, not only the wrinkle reduction effect but also a skin mark erasing effect can be obtained. For said two kinds of polyurethane having different particle sizes, polyurethanes having an average particle size of 20-60 nm and an average particle size of 150-200 nm are preferable.

[0075]

The blend ratio of the polyurethane is preferably 0.1-10 wt% of the total amount of the skin treatment composition. If the blend ratio is less than 0.1 wt% then the effect of the present invention cannot be obtained sufficiently; and if it is over 10 wt% then the film tends to peel off the skin. A more preferable blend ratio range is 1-8 wt% of the total amount of the skin treatment composition.

[0076]

Also, in the present invention, as described above, a water dispersion of an acrylic type polymer, i.e. a water-insoluble acrylic type polymer is dispersed in water, is used; said water dispersion is applied on the skin or substrate and upon drying forms a acrylic type polymer film on the skin or substrate. For said water dispersion, it is preferable to use those conventionally known as polymer emulsions such as a polymer emulsion obtained by emulsification polymerization of acrylic type monomers. Said acrylic type polymer has so-called film forming properties, which means, when the polymer emulsion is applied on the skin or substrate, it forms a film on the skin or

substrate as it dries. Therefore, although in the present invention the acrylic type polymer emulsion is preferably dispersed, i.e. diluted, in water before blending, it is also acceptable to  
5 use the acrylic type polymer emulsion as is for the water dispersion.

[0077]

For the acrylic type polymer of the present invention, polymers derived from monomers  
10 containing acrylic ester type monomers such as acrylic ester and methacrylic ester are preferable. Specific examples of said acrylic ester type monomers include methyl acrylate, ethyl acrylate, propyl acrylate, n-butyl acrylate, tert-butyl  
15 acrylate, hexyl acrylate, cyclohexyl acrylate, octyl acrylate, 2-ethylhexyl acrylate, methyl methacrylate, ethyl methacrylate, propyl methacrylate, n-butyl methacrylate, tert-butyl methacrylate, hexyl methacrylate, cyclohexyl  
20 methacrylate, octyl methacrylate, and 2-ethylhexyl methacrylate. The acrylic ester type monomers are used individually or in combinations of two or more.

[0078]

25 The monomers for making said acrylic type

polymer can contain, in addition to the acrylic ester type monomers, other hydrophobic monomers. Examples of said hydrophobic monomers include aromatic mono- and di- vinyl compounds such as  
5 styrene,  $\alpha$ -styrene, chlorostyrene, alkyl styrene, and divinyl styrene, vinyl cyanide compounds such as acrylonitrile and methacrylonitrile, vinyl esters such as vinyl acetate, vinyl halogenate such as vinyl chloride and vinylidene chloride,  
10 fluorocarbon monomers such as trifluoroethyl methacrylate, 2,2,3,3-tetrafluoropropyl methacrylate, 2,2,3,3,4,4-hexafluorobutyl methacrylate, perfluorooctyl methacrylate, and perfluorooctyl acrylate, and silicone macro  
15 monomers.

[0079]

It is common to copolymerize the acrylic type polymers of the present invention by further adding hydrophilic monomers. This way, stable  
20 polymer emulsion, i.e. stable water dispersion of an acrylic type polymer, can be obtained.

[0080]

Examples of the hydrophilic monomers include ethylene type unsaturated carboxylic acids such as  
25 acrylic acid, methacrylic acid, itaconic acid,

maleic acid, fumaric acid, and crotonic acid,  
ethylene type monomers containing a hydroxyl group  
such as hydroxyethyl acrylate, hydroxyethyl  
methacrylate, glycidyl acrylate, glycidyl  
5 methacrylate, ethylene glycol diacrylate, ethylene  
glycol dimethacrylate, polyethylene glycol  
monoacrylate, and polyethylene glycol  
monomethacrylate, ethylene type amides such as N-  
methylol methacrylamide and N-diacetone acrylamide,  
10 ethylene type amines such as aminoethyl acrylate, ,  
aminoethyl methacrylate, N,N-dimethylaminoethyl  
acrylate, N,N-dimethylaminoethyl methacrylate,  
N,N-diethylaminoethyl acrylate, N,N-  
diethylaminoethyl methacrylate, N,N,N-  
15 trimethylaminoethyl acrylate, N,N,N-  
trimethylaminoethyl methacrylate, as well as the  
salts thereof.

[0081]

If the hydrophilic monomers having a  
20 carboxyl group in the structure are used for  
preparing the acrylic type polymer emulsion, a  
neutralizer can be used to neutralize the carboxyl  
groups incorporated in the molecule to achieve  
superior dispersion of the acrylic type polymer  
25 into water. Examples of the neutralizer for said

carboxyl group include triethylamine, trimethylamine, 2-amino-2-methyl-1-propanol, triethanolamine, potassium hydroxide, and sodium hydroxide.

5 [0082]

The monomers containing acrylic type ester monomers for preparing the acrylic type polymer pertaining to the present invention can be used individually or in combinations of two or more  
10 kinds; a preferable combination has 70-100 mole% hydrophobic monomers and 0-30 mole% hydrophilic monomers, and a more preferable combination has 85-99 mole% hydrophobic monomers and 1-15 mole% hydrophilic monomers.

15 [0083]

For said acrylic type polymer of the present invention, a polymer polymerized from monomers whose main ingredient is an acrylic type ester monomer consisting of an acrylic ester and/or  
20 methacrylic ester is preferable. More preferable is a polymer from monomers whose main ingredient is ethyl acrylate and/or ethyl methacrylate, and even more preferable is a polymer from monomers whose main ingredient is ethyl acrylate.

25 [0084]

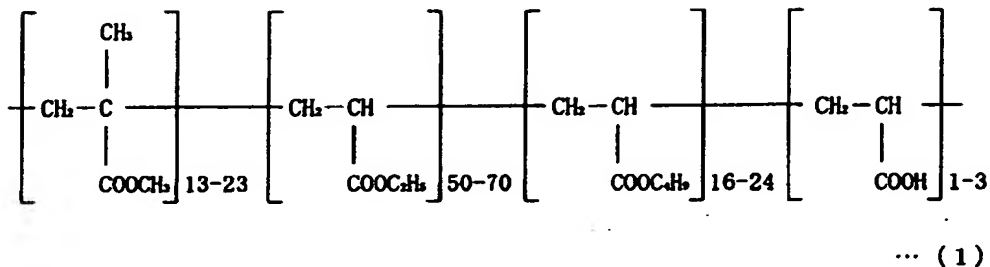
If hydrophilic monomers are to be included, acrylic acid and/or methacrylic acid are preferable for said monomers.

[0085]

5           Examples of a specific embodiment of the preferable acrylic type polymer in the present invention include the following formula (1):

[0086]

[Chemical formula 1-1]



10

[0087]

[0088]

The acrylic type polymer emulsion used in the present invention should preferably contain

15 sulfonated polyvinyl alcohol as an emulsifier/colloid agent to obtain finely textured film. It is particularly preferably to have this for said emulsification polymerization.

[0089]

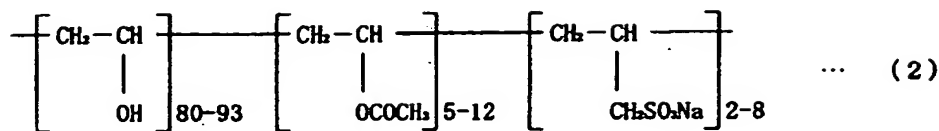
20           Examples of preferably used sulfonated polyvinyl alcohol include the following formula



(2) :

[0090]

[Chemical formula 1-2]



5 [0091]

Therefore, the water dispersion of the acrylic type polymer of the present invention should preferably contain sulfonated polyvinyl alcohol.

10 [0092]

Also, when preparing said acrylic type polymer emulsion, it is preferable to add a surfactant to stabilize dispersion at the time of the emulsion polymerization. Selection of the surfactant used is not limited in particular; a common anionic, cationic, or non-ionic surfactant can be used. It is also possible to use two or more kinds, such as a combination of an anionic type and non-ionic type and a combination of a cationic type and non-ionic type. Of said surfactants, a non-ionic surfactant is preferable.

[0093]

Examples of the non-ionic surfactant include

polyoxyethylene (hereafter "POE") alkyl ether, POE  
alkylphenyl ether, and POE-polypropylene oxide  
(hereafter "POP") block copolymer; examples of the  
anionic surfactant include alkylbenzene sulfonate,  
5 and alkylnaphthalene sulfonate, and polyethylene  
oxide alkyl ether sulfate. Examples of the  
cationic surfactant include primary, secondary,  
and tertiary amine salts, and quaternary ammonium  
salts having an aliphatic hydrocarbon group. A  
10 preferable non-ionic surfactant is POE alkyl ether,  
of which even more preferable is an alkyl ether  
having 12-20 POE carbons; POE oleyl ether is  
particularly preferable. The POE addition mole  
number is 30-65 moles, and more preferable is 40-  
15 60 moles.

[0094]

The amount of the surfactant added is  
preferably 5 weight parts or less, more preferably  
3 weight parts or less, per 100 weight parts of  
20 the monomers used. If it is over 5 weight parts  
then the physical properties of the film  
deteriorates.

[0095]

In the present invention, the following is  
25 even more preferable for said acrylic type polymer

and the water dispersion of the acrylic polymer (acrylic polymer emulsion or water dispersion thereof). That is:

[0096]

5           For the film strength of the acrylic type polymer, the strength is 0.1-100 kg/cm<sup>2</sup>, more preferably 10-70 kg/cm<sup>2</sup>. If the strength is less than 0.1 kg/cm<sup>2</sup>, then the film cannot follow the skin movements and peeling easily occurs. If it  
10 is over 100 kg/cm<sup>2</sup>, then the film causes discomfort on the skin. The elongation is 300-2000%, preferably 500-1000%. If the elongation is less than 300%, then the film formed on the skin cannot follow the skin movements very well. If it  
15 is over 2000%, then the wrinkle reduction effect becomes insufficient. The glass transition temperature (T<sub>g</sub>) of the acrylic type polymer is preferably 0°C or lower.

[0097]

20           The average particle size of the acrylic type polymer in the water dispersion of the acrylic type polymer is 100-600 nm. If the average particle size is less than 100 nm, then there is a sufficient small-wrinkle reduction  
25 effect but on the other hand the large-wrinkle

reduction effect becomes insufficient. If the average particle size is over 600 nm, then adhesion to the skin becomes poor and peeling tends to occur.

5 [0098]

The blend ratio of the acrylic polymer is preferably 1-20 wt% of the total amount of the skin treatment composition. If the blend ratio is less than 1% then the effect of the present  
10 invention cannot be obtained sufficiently; if it is over 20 wt% then the viscosity of the skin treatment composition become high and preparation of formulations and application on the skin become difficult. A more preferable blend ratio range is  
15 5-15 wt% of the total amount of the skin treatment composition.

[0099]

The present invention uses said film forming polymers of the present invention as the main  
20 ingredient and preferably consists of these polymers; however, other film forming polymers can be added within the range that does not affect the effect of the present invention, as long as the film shrinkage rate of the total film forming  
25 polymer is 20% or less.

[0100]

The skin treatment composition of the present invention can further contain scaly silica; this reinforce the wrinkle reduction effect of the film consisting of the polyurethane and acrylic type polymer as described above. Specifically, the film formed by the water dispersion of the polymer becomes thick and the wrinkle reduction effect is augmented and reinforced and thus a skin treatment composition for wrinkle reduction that can accommodate the elasticity and movement of the skin for a long duration of time can be obtained.

[0101]

Scaly silica is scale-like silica particles that have a film forming capability of their own and are able to form a strong film at ordinary temperatures. Scaly silica has a laminated particle configuration; it substantially consists of leaf-like secondary particles formed by multiple thin flake primary particles stacked together with their planes oriented parallel to each other. In the present invention, it is preferable to use micro-scaly silica.

[0102]

Scaly silica is commercially available;  
examples of commercial products that can be used  
include Sunlovely LFS-C (from Dohkai Chemical  
Industries Co., Ltd.).

5 [0103]

In the present invention, a preferable blend  
ratio of scaly silica is 0.1-5.0 wt%, more  
preferably 0.5-3.0 wt%, of the total amount of the  
skin treatment composition. If the blend ratio is  
10 less than 0.1 wt%, then the effect of adding scaly  
silica cannot be manifested sufficiently; if it is  
over 5.0 wt% then whiteness is seen on the skin  
surface, which is visually less agreeable.

[0104]

15 In addition to the aforementioned  
ingredients, other ingredients used in skin  
treatment compositions such as cosmetics and drugs  
can be blended as necessary into the skin  
treatment composition of the present invention as  
20 long as the effect of the present invention is not  
adversely affected. The aforementioned optional  
ingredients include oil components, power  
ingredients other than those mentioned above,  
surfactants, humectants, water soluble polymers,  
25 thickeners, film forming agents other than those

of the present invention, ultraviolet absorbents,  
sequestering agents, sugars, amino acids, organic  
amines, pH adjustment agents, nutritional  
supplements for skin, vitamins, antioxidants, and  
5 perfumes.

[0105]

The skin treatment composition for wrinkle  
reduction of the present invention can be prepared  
by blending in the aforementioned ingredients and  
10 following a conventional method.

[0106]

The skin treatment composition of the  
present invention is used in foundation cosmetic  
formulations in the form of cream, emulsion, or  
15 lotion.

[0107]

[Invention of claims 13-25]

The best embodiments of the present  
invention are described in detail below.

20 [0108]

The non-emulsifying type cross-linked  
silicone of the present invention is described in  
detail below.

[0109]

25 Non-emulsifying type cross-linked silicone

is a cross-linked silicone in which some of  
silicone chains are cross-linked, characterized by  
not having its own ability to emulsify oil and  
water. A cross-linked silicone is verified as  
5 non-emulsifying when a composition having water,  
oil, and the cross-linked silicone is stirred at a  
high speed using a homomixer and as a result  
emulsification does not occur or emulsification  
occurs but the particle size of the emulsified  
10 particles is large, 50 micrometers or more, and  
the emulsified state does not last when allowed to  
stand for a while.

[0110]

Examples of the non-emulsifying cross-linked  
15 silicone used in the present invention include a  
cross polymer derived from a reaction between  
methyl hydrogen polysiloxane and methylvinyl  
polysiloxane (hereafter  
"dimethicone/vinyldimethicone cross polymer"), a  
20 cross polymer derived from a reaction between  
partial long chain alkylated methyl hydrogen  
polysiloxane and methylvinyl polysiloxane  
(hereafter "vinyldimethicone/alkyldimethicone  
cross polymer"), and a cross polymer derived from  
25 a reaction between methyl hydrogen polysiloxane



and alkene (hereafter "dimethicone cross polymer").  
In the present invention, it is preferable to use  
one, two or more types selected from a group of  
the aforementioned three types of cross polymers.

5 [0111]

For the aforementioned methylvinyl  
polysiloxane, those that have at least two vinyl  
groups in the molecule are used in the present  
invention to effectively produce cross polymers.

10 For this production, methylvinyl polysiloxane  
having one vinyl group in the molecule is commonly  
used and this controls the cross-link ratio of the  
cross-polymer.

[0112]

15 The number of carbons in the long chain  
alkyl in the partial long chain alkylated methyl  
hydrogen polysiloxane can be set at will; in this  
invention a preferable number is 10-14 and a  
lauryl group, having 12 carbons, is the most  
20 preferable.

[0113]

For the aforementioned alkene, those that  
have at least two vinyl groups in the molecule are  
used in the present invention to effectively  
25 produce cross polymers. For this production,

alkene having one vinyl group in the molecule is commonly used and this controls the cross-link ratio of the cross-polymer.

[0114]

5           In the present invention, the aforementioned dimethicone/vinyldimethicone cross polymer corresponds to INCI designation "dimethicone/vinyldimethicone cross polymer" or "polysilicone-11". Dimethicone cross polymer  
10 corresponds to INCI designation "dimethicone cross polymer". Of vinyldimethicone/alkyldimethicone cross polymers, a cross polymer derived from a reaction between laurylated methyl hydrogen polysiloxane and methyl vinyl polysiloxane  
15 (hereafter "vinylmethicone/lauryldimethicone cross polymer") corresponds to INCI designation "vinyldimethicone/lauryldimethicone cross polymer".  
[0115]

          The blend ratio of the non-emulsifying  
20 cross-linked silicone is preferably 0.5-5.0 wt% of the total amount of the skin treatment composition. If the blend ratio is less than 0.5 wt% then the effect of the present invention is hard to obtain; on the other hand, adding more than 5.0 wt% would  
25 not increase the effect and stickiness would

result.

[0116]

Selection of the liquid oil component used in the present invention is not limited in particular as long as it is a liquid oil component that can be blended into a liquid cosmetic at an ordinary temperature (25°C). Examples of the liquid oil component include liquid silicone oil, liquid hydrocarbon oil, liquid ester oil, and liquid higher aliphatic acid.

[0117]

Examples of said liquid silicone oil include straight chain or cyclic silicone oil; specific examples include dimethyl silicone, decamethylcyclopentasiloxane, octamethylcyclotetrasiloxane, phenyl dimethicone, and octyl trimethicone.

[0118]

Examples of said liquid hydrocarbon oil include liquid petrolatum, squalane, light isoparaffin,  $\alpha$ -olefin oligomers, and isodecane.

[0119]

Examples of said liquid ester oil include glyceryl tri-2-ethylhexanoate, diisobutyl adipate, di-2-ethylhexyl succinate, cetyl 2-ethylhexanoate,

2-hexyldecyl 2-ethylhexanoate, neopentyl glycol  
di-2-ethylhexanoate, glyceryl tri-2-ethylhexanoate,  
trimethylolpropane tri-2-ethylhexanoate, glyceryl  
tri- (caprylate/caprate), neopentyl glycol  
5 dicaprate, 2-ethylhexyl isononanoate, isononyl  
isononanoate, isodecyl isononanoate, isotridecyl  
isononanoate, 2-octyldecyl myristate, isopropyl  
palmitate, 2-ethylhexyl palmitate, 2-hexyldecyl  
stearate, cetyl isostearate, isopropyl isostearate,  
10 2-hexyldecyl isostearate, isostearyl isostearate,  
isodecyl pivalate, isostearyl pivalate, 2-  
octyldodecyl pivalate, 2-octyldodecyl  
dimethyloctanoate, 2-ethylhexyl hydroxystearate,  
2-octyldodecyl 12-stearoylstearate, oleyl oleate,  
15 2-ethylhexyl salicylate, and jojoba oil.  
[0120]

Examples of said liquid higher aliphatic  
acid include isostearic acid.

[0121]

20 The liquid oil component in the present  
invention is blended in as a constituent  
ingredient of the skin treatment composition of  
the present invention; it also functions as a  
swelling agent of said non-emulsifying cross-  
25 linked silicone.

[0122]

In the present invention, when preparing the skin treatment composition, it is preferable to blend in the non-emulsifying cross-linked silicone in a swollen form (gel-like composition) swollen with said liquid oil component. This way, a skin treatment composition having a superior effect can be prepared in a stable form.

[0123]

For the liquid oil component for this purpose, a liquid oil component having a low viscosity at ordinary temperatures, 100 mPa·s or less for example, is preferable. A preferable viscosity range is 1-100 mPa·s.

[0124]

In the non-emulsifying cross-linked silicone swollen with the liquid oil, which is a preferable form for blending into the present invention, a preferable mass ratio of the non-emulsifying cross-linked silicone and the liquid oil is 5-40:95-60. Within this mass ratio range it is a preferable swollen material for the skin treatment composition of the present invention.

[0125]

Said swollen form of the non-emulsifying

cross-linked silicone is commercially available and therefore such commercial products can be used, examples of which follow.

[0126]

5           Examples of a swollen form of INCI designation dimethicone/vinyldimethicone cross polymer or polysilicone-11 include KSG-15 ((a mixture of dimethicone/vinyldimethicone) cross polymer and cyclopentasiloxane, approximately 5%  
10 of which is cross-linked), KSG-16 ((a mixture of dimethicone/vinyldimethicone) cross polymer and dimethicone 6 mPa·s, approximately 25% of which is cross-linked), KSG-18 ((a mixture of dimethicone/vinyldimethicone) cross polymer and  
15 phenyltrimethicone, approximately 15% of which is cross-linked) (these are from Shin-Etsu Chemical Co., Ltd.), GRANSIL GCM (a mixture of polysilicone-11 and octamethylcyclotetrasiloxane, approximately 6% of which is cross-linked),  
20 GRANSIL GCM-5 (a mixture of polysilicone-11 and decamethylcyclopentasiloxane, approximately 6% of which is cross-linked), GRANSIL IDS (a mixture of polysilicone-11 and isodecane, approximately 7% of which is cross-linked), GRANSIL DMG-6 (a mixture  
25 of polysilicone-11 and dimethicone 6 mPa·s,

approximately 18% of which is cross-linked),  
GRANSIL DMG-20 (a mixture of polysilicone-11 and  
dimethicone 20 mPa·s, approximately 25% of which  
is cross-linked), GRANSIL DMG-50 (a mixture of  
5 polysilicone-11 and dimethicone 50 mPa·s,  
approximately 26% of which is cross-linked), and  
GRANSIL PM (a mixture of polysilicone-11 and  
phenyltrimethicone, approximately 20% of which is  
cross-linked), and GRANSIL ININ (a mixture of  
10 polysilicone-11 and isononyl isononanoate,  
approximately 15% of which is cross-linked) (these  
are from GRANT Inc.).

[0127]

Examples of a swollen form of INCI  
15 designation vinyl dimethicone/lauryl dimethicone  
cross polymer include KSG-41 ((a mixture of  
vinyl dimethicone/lauryl dimethicone) cross polymer  
and liquid petrolatum, approximately 30% of which  
is cross-linked), KSG-42 ((a mixture of  
20 vinyl dimethicone/lauryl dimethicone) cross polymer  
and light isoparaffin, approximately 25% of which  
is cross-linked), KSG-43 ((a mixture of  
vinyl dimethicone/lauryl dimethicone) cross polymer  
and glyceryl tri-2-ethylhexanoate, approximately  
25 30% of which is cross-linked), and KSG-44 ((a

mixture of vinyl dimethicone/lauryl dimethicone) cross polymer and squalane, approximately 5% of which is cross-linked), all of which are from Shin-Etsu Chemical Co., Ltd.

5 [0128]

Examples of a swollen form of INCI designation dimethicone cross polymer include DC9040 (a mixture of dimethicone cross polymer and decamethylcyclopentasiloxane, approximately 12% of which is cross-linked), DC9041 (a mixture of dimethicone cross polymer and dimethicone 5 mPa·s, approximately 16% of which is cross-linked), and DC9045 (a mixture of dimethicone cross polymer and decamethylcyclopentasiloxane, approximately 12.5% of which is cross-linked), all of which are from Dow Corning Toray.

[0129]

The blend ratio of the liquid oil component is preferably 0.5-30 wt% of the total amount of the skin treatment composition. Within this blend ratio range, the effect of the present invention can be sufficiently obtained.

[0130]

The skin treatment composition for wrinkle reduction of the present invention further



contains as an essential ingredient a water insoluble film forming polymer having a film shrinkage rate of 20% or less; the main ingredient of said film forming polymer is polyurethane

5 having a film shrinkage rate of 20% or less. The film shrinkage rate is defined as described above.  
[0131]

In the present invention, the film forming polymer preferably consists of polyurethane having  
10 a film shrinkage rate of 20% or less. However, the present invention does not reject the addition of other film forming polymers within the range that does not adversely affect the effect of the present invention, provided that the film  
15 shrinkage rate of the total film forming polymer is 20% or less.

[0132]

Those for which said film shrinkage rate is over 20% have a poor wrinkle reduction effect,  
20 peel off the skin, cause noticeable "gloss", and exhibit poor usability due to discomfort; therefore they cannot manifest the effects of the present invention. The preferable range of the film shrinkage rate is 10% or less. The lower  
25 limit of the film shrinkage rate is 0, i.e. no

shrinkage, which is preferable; however, 5% is sufficient and also industrially practical. That is, the film shrinkage rate in the present invention is 0-20%; within this range, preferable combinations of the upper and lower limits are used, examples include 5-20%, 0-10%, and 5-10%.

[0133]

The polyurethane used in the present invention is a polymer having urethane bonds; the urethane bond is formed by an addition reaction between an isocyanate group and a compound having active hydrogen, such as a hydroxyl group. The polyurethane in the present invention is preferably obtained with a conventional method reacting at least (A) an isocyanate compound having two isocyanate groups and (B) a diol compound having two hydroxyl groups.

[0134]

Selection of said isocyanate compound (ingredient A) is not limited in particular as long as it is used in conventional polyurethane manufacturing, examples for which include organic diisocyanate compounds such as aliphatic diisocyanate compounds, alicyclic isocyanate compounds, and aromatic diisocyanate compounds.

More preferable are aliphatic diisocyanate compounds and alicyclic diisocyanate compounds. One, two or more isocyanate compounds are freely selected and used.

5 [0135]

Examples of said aliphatic diisocyanate compounds include ethylene diisocyanate, 2,2,4-trimethylhexamethylene diisocyanate, and 1,6-hexamethylene diisocyanate.

10 [0136]

Examples of said alicyclic diisocyanate compounds include hydrogenated 4,4'-diphenylmethane diisocyanate, 1,4-cyclohexane diisocyanate, methylcyclohexylene diisocyanate, 15 isophorone diisocyanate (hereafter referred to as "IPDI"), and norbornane diisocyanate.

[0137]

Examples of said aromatic diisocyanate compound include 4,4'-diphenylmethane diisocyanate, 20 xylylene diisocyanate, toluene diisocyanate, and naphthalene diisocyanate.

[0138]

Of the specific examples of said isocyanate compound (ingredient A), 1,6-hexamethylene 25 diisocyanate, IPDI, and norbornane diisocyanate

are preferable due to superior weather resistance and availability. IPDI is particularly preferable.  
[0139]

Selection of said diol compound (ingredient  
5 B) is not limited in particular as long as it is used in conventional polyurethane manufacturing, preferable examples for which include an alkylene diol, carboxyl group-containing alkyl diol, alicyclic diol, spiro diol, polyester diol,  
10 polyether diol, polycarbonate diol, polybutadiene diol, polyisoprene diol, and polyolefin diol. Of these, particularly preferably used are alkylene diol, carboxyl group-containing alkylene diol, alicyclic diol, polyether diol, and polycarbonate  
15 diol. One, two or more diol compounds are freely selected and used.

[0140]

Examples of said alkylene diol include ethylene glycol, propylene glycol, 1,4-butane diol,  
20 1,6-hexane diol, neopentyl glycol, 1,8-octane diol, and 1,10-decane diol.

[0141]

Preferable examples of said carboxyl group-containing alkylene diol include carboxylic acid  
25 having 3-26 carbons, more preferably 3-12 carbons,

as well as having a dialylol groups, such as dimethylol, diethanol and propanol. Specific examples include dimethylol propionic acid (hereafter "DMPA") and dimethylol butanoic acid (hereafter "DMBA"); a mixture thereof can be used as well.

[0142]

In the present invention, when a carboxyl group-containing alkylene diol is used for the diol compound in the synthesis to obtain polyurethane containing carboxyl groups in the molecule, the carboxyl groups incorporated in the molecule can be neutralized by neutralizers such as triethylamine, trimethylamine, 2-amino-2-methyl-1-propanol, triethanolamine, potassium hydroxide, and sodium hydroxide to obtain a stable water dispersion containing polyurethane, which is a preferred embodiment described later.

[0143]

Examples of said alicyclic diol include 1,4-cyclohexane dimethanol (hereafter "CHDM"), which is preferable because it gives adequate strength to the film.

[0144]

Preferable examples of said spiro diol

include spiro glycol.

[0145]

Examples of said polyester diol include those obtained by condensation polymerization  
5 between at least one chosen from a group of dicarboxylic acids including succinic acid, glutaric acid, adipic acid, sebacic acid, azelaic acid, maleic acid, fumaric acid, phthalic acid, and terephthalic acid and at least one chosen from  
10 a group of diols including ethylene glycol, propylene glycol, 1,4-butane diol, 1,6-hexane diol, neopentyl glycol, 1,8-octane diol, 1,10-decane diol, diethylene glycol, polyethylene glycol (hereafter "PEG"), polypropylene glycol (hereafter  
15 "PPG"), tetramethylene glycol, polytetramethylene glycol, and spiro glycol, as well as those obtained by the ring opening polymerization of lactonic acid.

[0146]

20 Examples of said polyether diol include polyether diols contained in diols used in the synthesis of said polyester diol, examples of which include polyoxyethylene diols such as . . . . .  
diethylene glycol and PEG, polyoxypropylene diols  
25 such as PPG, polyoxytetramethylene diols such as

polytetramethylene glycol (hereafter "PTMG"),  
phenols such as bisphenol A, and a product of the  
ring opening addition polymerization of bisphenol  
A and at least one compound chosen from propylene  
5 oxide (hereafter "PO") and ethylene oxide  
(hereafter "EO") (if a copolymer is used, such a  
copolymer can be either a block copolymer or  
random copolymer). Of these, PEG, PPG, and PTMG  
are preferable, and PTMG is particularly  
10 preferable since it forms a soft film and adheres  
to the skin very well.

[0147]

Preferable examples of said polycarbonate  
diol include polyhexamethylene carbonate diol  
15 (hereafter "PHMC") because of its ability to form  
a soft film and its superior adhesion to the skin.

[0148]

In the present invention, polyurethane that  
forms a film that manifests a superior wrinkle  
20 reduction effect can be obtained by using the diol  
compound (ingredient B) consisting of a mixture of  
a polyether diol, polycarbonate diol, and carboxyl  
group-containing alkylene diol.

[0149]

25 In the present invention, when mixing a

polyether diol, polycarbonate diol, and carboxyl group-containing alkylene diol, it is particularly preferable to use PTMG for said polyether diol, PHMC for the polycarbonate diol, and DMPA and/or DMBA for said carboxyl group-containing alkylene diol.

[0150]

In the present invention, when using the aforementioned preferable diol compounds, it is particularly preferable to use an isocyanate compound that contains IPDI; a skin treatment composition for wrinkle reduction having the most exceptional wrinkle reduction effect can be obtained by using polyurethane synthesized by using IPDI for the isocyanate and PTMG, PHMC, DMPA and/or DMBA for the diol compounds.

[0151]

The molar ratio of said isocyanate compound (ingredient A) and diol compound (ingredient B) is preferably  $A/B = 2/0.8-2/1.8$ , and more preferably  $A/B = 2/1-2/1.8$ .

[0152]

In the present invention, it is preferable to use polyurethane having structural units derived from alkylene oxide (hereafter "RO"); this



makes it easier to control the elongation of the film obtained from the water dispersion of the polyurethane that is a preferred embodiment described later to obtain a flexible film. A skin treatment composition that manifests superior effects and superior usability can be obtained by using this polyurethane for the preparation.

[0153]

Examples of the compound having a structural unit derived from R0 include a polyoxyethylene diol such as diethylene glycol and PEG, a polyoxypropylene diol such as PPG, a polyoxytetramethylene diol such as PTMG, polyoxyethylene polyoxypropylene glycol (EO/PO block copolymer), phenols such as bisphenol A, and a product of the ring opening addition polymerization of bisphenol A and at least one compound chosen from P0 and E0 (if a copolymer is used, such a copolymer can be either a block copolymer or random copolymer); preferably used are PEG, PPG, PTMG, etc.

[0154]

In the present invention, the compound having a structural unit derived from R0 is used as a polyether diol ingredient in said ingredient

B.

[0155]

is preferably blended in as a water dispersion,  
i.e. dispersed in water, which is an essential  
5 ingredient of the present invention. Said water  
dispersion, when applied on the skin and dried,  
forms a polymer film on the skin.

[0156]

In the present invention, when preparing the  
10 skin treatment composition, the film forming  
polymer

[0157]

The water dispersion of polyurethane is  
prepared with a conventional method; for example,  
15 a pre-polymer having remaining isocyanate obtained  
from a reaction in an organic solvent is dispersed  
in water containing potassium hydroxide under high  
speed agitation, followed by a chain elongation  
reaction to increase the molecular weight, and  
20 said organic solvent is recovered from the  
obtained water based solution to obtain the water  
dispersion of the polyurethane.

[0158]

In the present invention, the following is  
25 particularly preferable for said polyurethane and

water dispersion of polyurethane. That is:

[0159]

With regard to the film characteristics of the polyurethane, the strength is 300-700 kg/cm<sup>2</sup>,  
5 and preferably 400-600 kg/cm<sup>2</sup>. If the strength is less than 300 kg/cm<sup>2</sup>, then the film cannot follow the skin movements and peeling easily occurs. If it is over 700 kg/cm<sup>2</sup>, then the film causes discomfort on the skin. The elongation is 200-  
10 500%, preferably 300-500%. If the elongation is less than 200%, then the film formed on the skin cannot follow the skin movements very well. If it is over 500%, then the wrinkle reduction effect becomes insufficient.

15 [0160]

The average particle size of the polyurethane in the water dispersion of the polyurethane is 10-300 nm, preferably 20-200 nm. If the average particle size is less than 10 nm,  
20 then there is a sufficient small-wrinkle reduction effect but on the other hand the large-wrinkle reduction effect becomes insufficient. If the average particle size is over 300 nm, then adhesion to the skin becomes poor and peeling  
25 tends to occur.

[0161]

A preferable embodiment in the present invention uses two kinds of water dispersions of polyurethane having different particle sizes.

5 This way, not only the wrinkle reduction effect but also a skin mark erasing effect can be obtained. For said two kinds of polyurethane having different particle sizes, polyurethanes having an average particle size of 20-60 nm and an  
10 average particle size of 150-200 nm are preferable.

[0162]

Preparation examples of the polyurethane having a film shrinkage rate of 20% or less used in the present invention are described below.

15 [0163]

(Preparation example 2-1)

50 g of IPDI, 120 g of PTMG (molecular weight 1,000), 5 g of CHDM, and 10 g of DMBA were put into a four-neck flask equipped with a stirrer,  
20 a thermometer, a nitrogen introduction tube, and a reflux cooling apparatus, to which 50 g of ethyl acetate was added as a solvent, and then an oil bath was used to raise the temperature to 80°C and allow the reaction to proceed for 6 hours to  
25 obtain a pre-polymer having remaining isocyanate

groups. This pre-polymer having remaining isocyanate groups was cooled down to 50°C and dispersed in 800 g of water containing 6 g of potassium hydroxide under high speed stirring, followed by 3 hours of a chain elongation reaction at 50°C to increase the molecular weight. Said ethyl acetate was recovered from the obtained water-based liquid to obtain a water dispersion of polyurethane substantially having no solvent (polyurethane solid content 20 wt%). (Average particle size: 170 nm, film strength: 410 kg/cm<sup>2</sup>, film elongation: 320%, film shrinkage rate: 11%)

[0164]

15 (Preparation example 2-2)

50 g of IPDI, 60 g of PTMG (molecular weight 1,000), 40 g of PHMC (molecular weight 2,000), and 10 g of DMBA were put into a four-neck flask equipped with a stirrer, a thermometer, a nitrogen introduction tube, and a reflux cooling apparatus, to which 50 g of ethyl acetate was added as a solvent, and then an oil bath was used to raise the temperature to 80°C and allow the reaction to proceed for 3 hours. 2 g of N-methyldiethanolamine (NMDE tA) and 40 g of ethyl

acetate were added, followed by 3 hours of reaction at 80°C to obtain a pre-polymer having remaining isocyanate groups. This pre-polymer having remaining isocyanate groups was cooled down to 50°C and dispersed in 700 g of water containing 6 g of potassium hydroxide under high speed stirring, followed by 3 hours of a chain elongation reaction at 50°C to increase the molecular weight. Said ethyl acetate was recovered from the obtained water-based liquid to obtain a water dispersion of polyurethane substantially having no solvent (polyurethane solid content 20 wt%).

(Average particle size: 40 nm, film strength: 530 kg/cm<sup>2</sup>, film elongation: 360%, film shrinkage rate: 9%)

[0165]

The blend ratio of the polyurethane having a film shrinkage rate of 20% or less in the present invention is preferably 0.1-10.0 wt% of the total amount of the skin treatment composition. If the blend ratio is less than 0.1 wt% then the effect of the present invention is hard to be obtained sufficiently; and if it is over 10.0 wt% then the film tends to peel off the skin. A more

preferable blend ratio range is 1.0-8.0 wt% of the total amount of the skin treatment composition.

[0166]

As mentioned before, the skin treatment composition of the present invention can contain, in addition to the polyurethane having a film shrinkage rate of 20% or less, other film forming polymers, examples of which include acrylic type polymers. Even when film forming polymers other than the polyurethane having a film shrinkage rate of 20% or less are added, the blend ratio of the total film forming polymers is still preferably in the range of 0.1-10.0 wt%.

[0167]

The other essential ingredient of the present invention is water. Water other than the water contained in said essential ingredients is further added as appropriate to form the skin treatment composition.

[0168]

In addition to the aforementioned ingredients, other ingredients used in skin treatment compositions such as cosmetics and drugs can be blended as necessary into the skin treatment composition of the present invention as

long as the effect of the present invention is not adversely affected. The aforementioned optional ingredients include, albeit partially redundant, oil components, power ingredients, surfactants, humectants, water soluble polymers, thickeners, ultraviolet absorbents, sequestering agents, sugars, amino acids, organic amines, pH adjustment agents, nutritional supplements for skin, vitamins, antioxidants, and perfumes that are not those mentioned above.

[0169]

The skin treatment composition for wrinkle reduction of the present invention can be prepared by blending in the aforementioned ingredients and following a conventional method.

[0170]

The skin treatment composition of the present invention is used in foundation cosmetic formulations in the form of a cream, emulsion, lotion, or gel.

#### EXAMPLES

[0171]

[Invention of claims 1-12]

(Preparation example 1-1)



## Synthesis of a water dispersion of polyurethane

50 g of IPDI, 120 g of PTMG (molecular weight 1,000), 5 g of CHDM, and 10 g of DMBA were put into a four-neck flask equipped with a stirrer, a thermometer, a nitrogen introduction tube, and a reflux cooling apparatus, to which 50 g of ethyl acetate was added as a solvent, and then an oil bath was used to raise the temperature to 80°C and allow the reaction to proceed for 6 hours to obtain a pre-polymer having remaining isocyanate groups. This pre-polymer having remaining isocyanate groups was cooled down to 50°C and dispersed in 800 g of water containing 6 g of potassium hydroxide under high speed stirring, followed by 3 hours of a chain elongation reaction at 50°C to increase the molecular weight. Said ethyl acetate was recovered from the obtained water-based liquid to obtain a water dispersion of polyurethane substantially having no solvent

(polyurethane solid content 20 wt%).

(Average particle size: 170 nm, film strength: 410 kg/cm<sup>2</sup>, film elongation: 320%, film shrinkage rate: 11%)

[0172]

(Preparation example 1-2)

## Synthesis of a water dispersion of polyurethane

50 g of IPDI, 60 g of PTMG (molecular weight 1,000), 40 g of PHMC (molecular weight 2,000), and 10 g of DMBA were put into a four-neck flask equipped with a stirrer, a thermometer, a nitrogen introduction tube, and a reflux cooling apparatus, to which 50 g of ethyl acetate was added as a solvent, and then an oil bath was used to raise the temperature to 80°C and allow the reaction to proceed for 3 hours. 2 g of N-methyldiethanolamine (NMDE tA) and 40 g of ethyl acetate were added, followed by 3 hours of reaction at 80°C to obtain a pre-polymer having remaining isocyanate groups. This pre-polymer having remaining isocyanate groups was cooled down to 50°C and dispersed in 700 g of water containing 6 g of potassium hydroxide under high speed stirring, followed by 3 hours of a chain elongation reaction at 50°C to increase the molecular weight. Said ethyl acetate was recovered from the obtained water-based liquid to obtain a water dispersion of polyurethane substantially having no solvent (polyurethane solid content 20 wt%). (Average particle size: 40 nm, film strength: 530

kg/cm<sup>2</sup>, film elongation: 360%, film shrinkage rate: 9%)

[0173]

(Preparation example 1-3)

- 5 Synthesis of a water dispersion of an acrylic type polymer (acrylic type polymer emulsion)
- 100 g of ion-exchanged water and 2 g of polyoxyethylenecetyl ether were put into a four-neck flask equipped with stirring blades, a
- 10 thermometer, a nitrogen introduction tube, and a reflux cooling apparatus; the mixture was heated and stirred as nitrogen gas was instilled into it and the liquid temperature was maintained at 80°C. Meanwhile, a monomer mixed solution consisting of
- 15 40 g of ion-exchanged water, 1 g of sodium laurylsulfate, 1 g of polyoxyethylenecetyl ether, 50 g of methyl methacrylate, 42 g of 2-ethylhexyl acrylate, 3 g of methacrylic acid, and 1.4 g of sulfonated polyvinyl alcohol and an initiator
- 20 aqueous solution containing 0.3 parts potassium persulfate and 10 parts ion-exchanged water were prepared. 5 wt% of the monomer mixed solution and 10 wt% of the initiator aqueous solution were added to a four-neck flask and stirred to initiate
- 25 an emulsification polymerization reaction; the

rest of the monomer mixed solution and the initiator aqueous solution were concurrently dripped into the four-neck flask over a period of approximately three hours. Stirring was continued  
5 for another hour as the liquid temperature was kept at 80°C and then the obtained reaction mixture was cooled down to 50°C. Aqueous ammonia was then added to adjust the pH to approximately 8 and the temperature was cooled down to room  
10 temperature to obtain the target water dispersion of acrylic type polymer (acrylic type polymer solid content 50 wt%).

(Average particle size: 480 nm, film strength: 20 kg/cm<sup>2</sup>, film elongation: 700%, film shrinkage  
15 rate: 6%)

[0174]

(Preparation example 1-4)

Synthesis of a water dispersion of an acrylic type polymer (acrylic type polymer emulsion)  
20 100 g of ion-exchanged water and 2 g of polyoxyethylenestearyl ether were put into a four-neck flask equipped with stirring blades, a thermometer, a nitrogen introduction tube, and a reflux cooling apparatus; the mixture was heated  
25 and stirred as nitrogen gas was instilled into it

and the liquid temperature was maintained at 80°C .  
Meanwhile, a monomer mixed solution consisting of  
40 g of ion-exchanged water, 1 g of sodium  
polyoxyethylene laurylsulfate, 1 g of  
5 polyoxyethylene stearyl ether, 30 g of methyl  
methacrylate, 67 g of 2-ethylhexyl acrylate, and 3  
g of methacrylic acid and an aqueous solution  
containing 0.3 parts potassium persulfate and 10  
parts ion-exchanged water were prepared. 5 wt% of  
10 the monomer mixed solution and 10 wt% of the  
initiator aqueous solution were added to a four-  
neck flask and stirred to initiate an  
emulsification polymerization reaction; the rest  
of the monomer mixed solution and the initiator  
15 aqueous solution were concurrently dripped into  
the four-neck flask over a period of approximately  
three hours. Stirring was continued for another  
hour as the liquid temperature was kept at 80°C  
and then the obtained reaction mixture was cooled  
20 down to 50°C . Aqueous ammonia was then added to  
adjust the pH to approximately 8 and the  
temperature was cooled down to room temperature to  
obtain the target water dispersion of an acrylic  
type polymer (acrylic type polymer solid content  
25 50 wt%).

(Average particle size: 100 nm, film strength: 50 kg/cm<sup>2</sup>, film elongation: 500%, film shrinkage rate: 7%)

[0175]

5 (Method for evaluating/measuring the film)

1. Film shrinkage rate

A water dispersion of a solid equivalent 1 g of the polymer (polyurethane, acrylic type polymer, etc.) was poured into a 5 cm x 5 cm polyethylene mold such that the film thickness is approximately 0.5 mm and dried at a prescribed temperature (50°C) for a prescribed amount of time (three days at room temperature) to obtain a film, and vertical height and horizontal length of this film were measured and used in the following formula to calculate the film shrinkage rate.

[0176]

Film shrinkage rate (%) = [(Vertical measurement x Horizontal measurement)/25] x 100

20 [0177]

2. Measurement of the strength and elongation of the film

A water dispersion of a solid equivalent 1 g of the polymer (polyurethane, acrylic type polymer, etc.) was poured into a 5 cm x 5 cm polyethylene

mold such that the film thickness is approximately 0.5 mm and dried at a prescribed temperature (50°C) for a prescribed amount of time (three days at room temperature) to obtain a film, and this  
5 film was cut out using a dumbbell #3 for the measurement. The autograph function of "Tensile tester RTM-250" from Orientec Co., Ltd. was used to carry out the measurement of the strength and elongation at 20°C and a cross head speed of 300  
10 mm/min.

[0178]

3. Particle size measurement of the water dispersion

The water dispersion of the polymer  
15 (polyurethane, acrylic type polymer, etc.) was measured with a laser light scattering particle size distribution measuring apparatus from Otsuka Electronics Co., Ltd.

[0179]

20 The present invention is described in detail below by referring to Examples. The blend ratios are in wt% units. Before the description of Examples, the efficacy test method used in the present invention is described.

25 [0180]

(Sensory test)

Each specimen was tested by a panel of 10 specialists for the sensation during use. Each specimen was evaluated based on the following  
5 criteria for usability and the sensation during use, including (1) the wrinkle reduction effect right after application, (2) the wrinkle reduction effect five hours after application, (3) peeling off the skin (right after application, three hours  
10 after application), (4) glossiness (skin greasy and shining), (5) no stickiness (right after application, three hours after application), and (6) no discomfort.

[0181]

15 "Evaluation criteria"

(1) Wrinkle reduction effect right after application

◎ : 8 or more felt a wrinkle reduction effect.

○ : 5-7 felt a wrinkle reduction effect.

20 △ : 3-4 felt a wrinkle reduction effect.

× : 2 or fewer felt a wrinkle reduction effect.

[0182]

(2) Wrinkle reduction effect five hours after application

25 ◎ : 8 or more felt a wrinkle reduction effect.



- : 5-7 felt a wrinkle reduction effect.
- △ : 3-4 felt a wrinkle reduction effect.
- × : 2 or fewer felt a wrinkle reduction effect.

[0183]

5 (3) Peeling off from the skin

- ◎ : 8 or more felt there was no peeling off.
- : 5-7 felt there was no peeling off.
- △ : 3-4 felt there was no peeling off.
- × : 2 or fewer felt there was no peeling off.

10 [0184]

(4) Glossiness

- ◎ : 8 or more felt there was no glossiness.
- : 5-7 felt there was no glossiness.
- △ : 3-4 felt there was no glossiness.

15 × : 2 or fewer felt there was no glossiness.

[0185]

(5) No stickiness

- ◎ : 8 or more felt there was no stickiness.
- : 5-7 felt there was no stickiness.
- △ : 3-4 felt there was no stickiness.

20

- × : 2 or fewer felt there was no stickiness.

[0186]

(6) No discomfort

- ◎ : 8 or more felt there was no discomfort.

25 ○ : 5-7 felt there was no discomfort.

△ : 3-4 felt there was no discomfort.

× : 2 or fewer felt there was no discomfort.

[0187]

"Examples 1-1 to 1-13, Comparative examples 1-1 to  
5 1-9"

Skin treatment compositions for wrinkle  
reduction were prepared by mixing ingredients with  
blend ratios (total blend ratio 100 wt%) according  
to the recipes shown in Tables 1-1 to 1-3. Also,  
10 the efficacy test was conducted on the skin  
treatment compositions for wrinkle reduction from  
the aforementioned Examples 1-1 to 1-13 and  
Comparative examples 1-1 to 1-9; the evaluation  
results are also shown in Tables 1-1 to 1-3.

[0188]

[Table 1-1]

	Example								
	1-1	1-2	1-3	1-4	1-5	1-6	1-7	1-8	1-9
Ion-exchanged water	Balance	Balance	Balance	Balance	Balance	Balance	Balance	Balance	Balance
Glycerin	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Water dispersion of polyurethane (solid content 20 wt%) (preparation example 1)	10.0	5.0	10.0	-	-	5.0	45.0	10.0	10.0
Water dispersion of polyurethane (solid content 20 wt%) (preparation example 2)	-	5.0	-	10.0	10.0	-	-	10.0	20.0
Water dispersion of an acrylic type polymer (solid content 50 wt%) (preparation example 3)	10.0	10.0	-	10.0	-	5.0	-	15.0	10.0
Water dispersion of an acrylic type polymer (solid content 50 wt%) (preparation example 4)	-	-	10.0	-	10.0	-	30.0	-	10.0
Total	100	100	100	100	100	100	100	100	100
Wrinkle reduction effect right after application	◎	◎	◎	◎	◎	◎	◎	◎	◎
Wrinkle reduction effect five hours after application	◎	◎	◎	◎	◎	○	◎	◎	◎
Peeling	◎	◎	◎	◎	◎	◎	○	◎	◎
Glossiness	◎	◎	◎	◎	◎	◎	○	◎	◎
No stickiness	◎	◎	◎	◎	◎	◎	○	◎	◎
No discomfort	◎	◎	◎	◎	◎	◎	◎	◎	◎

[0189]

[Table 1-2]

	Example			
	1-10	1-11	1-12	1-13
Ion-exchanged water	Balance	Balance	Balance	Balance
Glycerin	6.0	6.0	6.0	6.0
Water dispersion of polyurethane (solid content 20 wt%) (preparation example 1)	5.0	5.0	5.0	5.0
Water dispersion of polyurethane (solid content 20 wt%) (preparation example 2)	5.0	5.0	5.0	5.0
Water dispersion of an acrylic type polymer (solid content 50 wt%) (preparation example 3)	10.0	5.0	10.0	5.0
Water dispersion of an acrylic type polymer (solid content 50 wt%) (preparation example 4)	—	5.0	—	5.0
Water dispersion of scaly silica (solid content 15 wt%) (Note 6)	10.0	10.0	4.0	20.0
Total	100	100	100	100
Wrinkle reduction effect right after application	◎	◎	◎	◎
Wrinkle reduction effect five hours after application	◎	◎	◎	◎
Peeling	◎	◎	◎	◎
Glossiness	◎	◎	◎	◎
No stickiness	◎	◎	◎	◎
No discomfort	◎	◎	◎	◎

[0190]

[Table 1-3]

	Comparative example								
	1-1	1-2	1-3	1-4	1-5	1-6	1-7	1-8	1-9
Ion-exchanged water	Balance	Balance	Balance	Balance	Balance	Balance	Balance	Balance	Balance
Glycerin	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Water dispersion of polyurethane (solid content 20 wt%) (preparation example 1)	-	-	-	10.0	10.0	-	-	-	-
Water dispersion of an acrylic type polymer (solid content 50 wt%) (preparation example 3)	-	-	-	-	-	-	-	10.0	10.0
Commercially available water dispersion of polyurethane (solid content 33 wt%) (Note 1)	10.0	-	-	-	-	-	-	-	-
Commercially available water dispersion of polyurethane (solid content 39 wt%) (Note 2)	-	10.0	-	-	-	-	-	-	-
Commercially available water dispersion of polyurethane (solid content 20 wt%) (Note 3)	-	-	10.0	-	-	-	-	-	10.0
Commercially available water dispersion of an acrylic type polymer (solid content 50 wt%) (Note 4)	-	-	-	-	10.0	10.0	-	-	-
Commercially available water dispersion of an acrylic type polymer (solid content 48 wt%) (Note 5)	-	-	-	-	-	-	10.0	-	-
Total	100	100	100	100	100	100	100	100	100
Wrinkle reduction effect right after application	○	○	○	△	○	○	○	△	○
Wrinkle reduction effect five hours after application	×	×	×	×	×	×	×	×	×
Peeling	×	×	×	△	×	×	×	△	×
Glossiness	×	×	×	△	×	×	×	△	×
No stickiness	○	○	○	○	×	×	×	×	×
No discomfort	×	×	×	○	×	×	×	○	×

[0191]

In Tables 1-1 to 1-3:

(Note 1) Avalure UR405 (from NOVEON)

(Average particle size: 100 nm, strength: 40 kg/cm<sup>2</sup>, elongation: 150%, film shrinkage rate: 35%)

5 (Note 2) Avalure UR445 (from NOVEON)

(Average particle size: 5 nm, strength: 240 kg/cm<sup>2</sup>, elongation: 610%, film shrinkage rate: 27%)

(Note 3) Iodosol PUD (from Nippon NSC)

10 (Average particle size: 20 nm, strength: 200 kg/cm<sup>2</sup>, elongation: 530%, film shrinkage rate: 23%)

(Note 4) Dashcoat (from Daito Kasei Kogyo Co., Ltd.)

15 (Average particle size: 150 nm, strength: 15 kg/cm<sup>2</sup>, elongation: 700%, film shrinkage rate: 25%)

(Note 5) Ultrasol 2075C (from Ganz Chemical Co., Ltd.)

20 (Average particle size: 200 nm, strength: 40 kg/cm<sup>2</sup>, elongation: 1000%, film shrinkage rate: 13%)

(Note 6) Sunlovely LFS-C (solid content 15%) (from Dohkai Chemical Industries Co., Ltd.)

25 [0192]

As clearly shown in Tables 1-1 to 1-3, the skin treatment compositions for wrinkle reduction from Examples 1-13 pertaining to the present invention are superior in terms of the wrinkle reduction effect and free of peeling, glossiness, stickiness, and discomfort. On the contrary, skin treatment compositions for wrinkle reduction from Comparative examples 1-9, which do not meet the constituent requirements of the present invention, do not manifest the effects of the present invention.

[0193]

More Examples of the skin treatment composition for wrinkle reduction of the present invention are described below. The aforementioned efficacy test was conducted on these and the results were superior for all of these.

[0194]

[Example 1-14] Skin treatment composition for wrinkle reduction (cream type)

Ingredients	Blend ratio (wt%)
(1) Stearyl alcohol	6.0
(2) Stearic acid	2.0
(3) Hydrated lanolin	4.0
(4) Squalane	9.0

	(5) 5-Octyldodecanol	10.0
	(6) 1,3-butylene glycol	6.0
	(7) Water dispersion of polyurethane from preparation example 1	5.0
5	(8) Water dispersion of polyurethane from preparation example 2	10.0
	(9) Water dispersion of an acrylic type polymer from preparation example 3	8.0
	(10) PEG 1500	4.0
10	(11) Polyoxyethylene (25) cetyl alcohol ether	3.0
	(12) Glycerin monostearate	2.0
	(13) Ethylparaben	0.1
	(14) Butylparaben	0.1
15	(15) Tocopherol	0.01
	(16) Perfume	0.1
	(17) Purified water	Balance
	(18) Scaly silica slurry (Note 1)	5.0
		Total 100.0
20	[0195]	
	(Note 1) Sunlovely LFS-C (solid content 15%) (from Dohkai Chemical Industries Co., Ltd.)	
	[0196]	
	<Preparation method>	
25	(6), (10), (13), and (14) were added to (17)	



and the temperature was raised and adjusted to 70°C. Next, the oil phase consisting of (1), (2), (3), (4), (5), (11), (12), (15), and (16) were prepared and the temperature was adjusted to 70°C.

5 This is added to the water phase previously prepared; a homomixer was used to homogenize the emulsified particles and (7), (8), (9), and (18) were added. After deaeration, filtration, and cooling, the target cream for wrinkle reduction  
10 was obtained.

[0197]

[Example 1-15] Skin treatment composition for wrinkle reduction (lotion type)

	Ingredients	Blend ratio (wt%)
15	(1) Stearic acid	2.0
	(2) Cetyl alcohol	1.5
	(3) Petrolatum	4.0
	(4) Squalane	5.0
	(5) Glycerol tri-2-ethylhexanoate	2.0
20	(6) Sorbitan monooleate	2.0
	(7) Dipropylene glycol	5.0
	(8) PEG 1500	3.0
	(9) Water dispersion of polyurethane from preparation example 1	2.0
25	(10) Water dispersion of polyurethane from	

	preparation example 2	8.0
	(11) Water dispersion of an acrylic type polymer	
	from preparation example 4	10.0
	(12) Triethanolamine	1.0
5	(13) Methylparaben	0.1
	(14) Phenoxy ethanol	0.1
	(15) Perfume	0.1
	(16) Purified water	Balance
	Total	100.0

10 [0198]

<Preparation method>

(7), (8), (12), (13), and (14) were added to (16) and the temperature was raised and adjusted to 70°C. The oil phase consisting of (1), (2),  
15 (3), (4), (5), (6), and (15) were prepared and the temperature was adjusted to 70°C. This oil phase was added to the water phase previously prepared and pre-emulsification was carried out. After homogenizing the emulsified particles with a  
20 homomixer, (9), (10), and (11) were added to obtain the target lotion for wrinkle reduction.

[0199]

[Example 1-16] Skin treatment composition for wrinkle reduction (gel type)

25	Ingredients	Blend ratio (wt%)
----	-------------	-------------------

	(1) Dipropylene glycol	7.0
	(2) PEG 1500	8.0
	(3) Carboxyvinyl polymer	0.4
	(4) Methylcellulose	0.2
5	(5) Polyoxyethylene (15) oleyl alcohol ether	1.0
	(6) Potassium hydroxide	0.1
	(7) Water dispersion of polyurethane from preparation example 1	3.0
10	(8) Water dispersion of polyurethane from preparation example 2	4.0
	(9) Water dispersion of an acrylic type polymer from preparation example 3	5.0
	(10) Edetate	0.01
15	(11) Perfume	0.1
	(12) Purified water	Balance
	(13) Ethylparaben	0.2
	Total	100.0

[0200]

20 <Preparation method>

(3) and (4) were homogeneously dissolved in (12), to which (2) and (10) were added. (5) was added to (1) and heated and dissolved at 55°C, to which (11) and (13) were added. This was slowly  
25 added to the water phase prepared previously as

the latter was being stirred. Next, (7), (8), and (9) were added. Finally, an aqueous solution of (6) was added and thorough stirring was done for neutralization to obtain the target gel for

5 wrinkle reduction.

[0201]

[Example 1-17] Skin treatment composition for wrinkle reduction (lotion type)

	Ingredients	Blend ratio (wt%)
10	(1) Stearic acid	2.0
	(2) Cetyl alcohol	1.5
	(3) Petrolatum	4.0
	(4) Squalane	5.0
	(5) Glycerol tri-2-ethylhexanoate	2.0
15	(6) Sorbitan monooleate	2.0
	(7) Dipropylene glycol	5.0
	(8) PEG 1500	3.0
	(9) Water dispersion of polyurethane from preparation example 1	0.5
20	(10) Water dispersion of polyurethane from preparation example 2	9.5
	(11) Water dispersion of an acrylic type polymer from preparation example 3	10.0
	(12) Water dispersion of cross linked sodium poly-	
25	$\gamma$ -glutamate (Note 1)	10.0

	(13) Triethanolamine	1.0
	(14) Methylparaben	0.1
	(15) Phenoxy ethanol	0.1
	(16) Perfume	0.1
5	(17) Purified water	Balance
		Total 100.0

[0202]

(Note 1) Gelprotein A-8001 (solid content 2 wt%)  
(from Idemitsu Technofine Co., Ltd.)

10 [0203]

<Preparation method>

(7), (8), (12), (13), (14), and (15) were added to (17) and the temperature was raised and adjusted to 70°C. Next, the oil phase consisting of (1), (2), (3), (4), (5), (6), and (16) were prepared and the temperature was adjusted to 70°C. This oil phase was added to the water phase prepared as above and pre-emulsification was carried out. After the emulsified particles were homogenized with a homomixer, (9), (10), and (11) were added to obtain the target lotion type for wrinkle reduction.

[0204]

[Example 1-18] Skin treatment composition for wrinkle reduction (gel type)

	Ingredients	Blend ratio (wt%)
	(1) Dipropylene glycol	5.0
	(2) Glycerin	2.0
	(3) PEG 1500	8.0
5	(4) Carboxyvinyl polymer	0.4
	(5) Methylcellulose	0.2
	(6) Polyoxyethylene (15) oleyl alcohol ether	1.0
	(7) Potassium hydroxide	0.1
10	(8) Water dispersion of polyurethane from preparation example 1	1.0
	(9) Water dispersion of polyurethane from preparation example 2	6.0
	(10) Water dispersion of an acrylic type polymer from preparation example 3	5.0
15	(11) Water dispersion of cross linked sodium poly- $\gamma$ -glutamate (Note 1)	50.0
	(12) Edetate	0.01
	(13) Perfume	0.1
20	(14) Purified water	Balance
	(15) Ethylparaben	0.2
	Total	100.0

[0205]

(Note 1) Gelprotein A-8001 (solid content 2 wt%)  
25 (from Idemitsu Technofine Co., Ltd.)

[0206]

<Preparation method>

(4) and (5) were homogeneously dissolved in (14) and then (2), (3), (11), and (12) were added. 5 (6) was added to (1) and heated and dissolved at 60°C, to which (13) and (15) were added. This was slowly added to the water phase prepared previously as the latter was being stirred. Next, (7), (8), and (10) were added. Finally, an 10 aqueous solution of (7) was added and thorough stirring was done for neutralization to obtain the target gel for wrinkle reduction.

[0207]

[Invention of claims 13-25]

15 The present invention is described in detail below by referring to Examples. The blend ratios are in wt% units. Before the description of Examples, the method for evaluating/measuring the film and the efficacy test method used in the 20 present invention are described.

[0208]

[Method for evaluating/measuring the film)

(1) Film shrinkage rate

A water dispersion of a solid equivalent 1 g 25 of the polymer is poured into a 5 cm x 5 cm

polyethylene mold such that the film thickness is approximately 0.5 mm and dried at a prescribed temperature (50°C) for a prescribed amount of time (three days at room temperature) to obtain a film, and vertical height and horizontal length of this film are measured and used in the following formula to calculate the film shrinkage rate.

[0209]

$$\text{Film shrinkage rate (\%)} = [(\text{Vertical measurement} \times \text{Horizontal measurement}) / 25] \times 100$$

[0210]

(2) Measurement of the strength and elongation of the film

A water dispersion of a solid equivalent 1 g of the polymer was poured into a 5 cm x 5 cm polyethylene mold such that the film thickness is approximately 0.5 mm and dried at a prescribed temperature (50°C) for a prescribed amount of time (three days at room temperature) to obtain a film, and this film was cut out using a dumbbell #3 for the measurement. The autograph function of "Tensile tester RTM-250" from Orientec Co., Ltd. was used to carry out the measurement of the strength and elongation at 20°C and a cross head speed of 300 mm/min.



[0211]

(3) Particle size measurement of the water dispersion

The water dispersion of the polymer was  
5 measured with a laser light scattering particle  
size distribution measuring apparatus from Otsuka  
Electronics Co., Ltd.

[0212]

[Sensory test]

10 Each specimen was used by a panel of 10  
specialists. The specialists assessed each  
specimen for usability and the sensation during  
use, including (1) the wrinkle reduction effect  
right after application, (2) the wrinkle reduction  
15 effect five hours after application, (3) peeling  
off the skin (right after application, three hours  
after application), (4) glossiness (skin greasy  
and shining), (5) no stickiness (right after  
application, three hours after application), and  
20 (6) no discomfort; the evaluation was conducted by  
using the following criteria.

[0213]

"Evaluation criteria".

(1) Wrinkle reduction effect right after  
25 application

◎ : 8 or more felt a wrinkle reduction effect.  
○ : 5-7 felt a wrinkle reduction effect.  
△ : 3-4 felt a wrinkle reduction effect.  
× : 2 or fewer felt a wrinkle reduction effect.

5 [0214]

(2) Wrinkle reduction effect five hours after application

◎ : 8 or more felt a wrinkle reduction effect.  
○ : 5-7 felt a wrinkle reduction effect.

10 △ : 3-4 felt a wrinkle reduction effect.

× : 2 or fewer felt a wrinkle reduction effect.

[0215]

(3) Peeling off from the skin

◎ : 8 or more felt there was no peeling off.

15 ○ : 5-7 felt there was no peeling off.

△ : 3-4 felt there was no peeling off.

× : 2 or fewer felt there was no peeling off.

[0216]

(4) Glossiness

20 ◎ : 8 or more felt there was no glossiness.

○ : 5-7 felt there was no glossiness.

△ : 3-4 felt there was no glossiness.

× : 2 or fewer felt there was no glossiness.

[0217]

25 (5) No stickiness

◎ : 8 or more felt there was no stickiness.  
○ : 5-7 felt there was no stickiness.  
△ : 3-4 felt there was no stickiness.  
× : 2 or fewer felt there was no stickiness.

5 [0218]

(6) No discomfort

◎ : 8 or more felt there was no discomfort.  
○ : 5-7 felt there was no discomfort.  
△ : 3-4 felt there was no discomfort.

10 × : 2 or fewer felt there was no discomfort.

[0219]

[Examples 2-1 to 2-8, Comparative examples 2-1 to  
2-11]

Skin treatment compositions for wrinkle  
15 reduction were prepared by mixing ingredients with  
blend ratios (total blend ratio 100 wt%) according  
to the recipes shown in Tables 2-1 to 2-4. Also,  
the efficacy test was conducted on the skin  
treatment compositions for wrinkle reduction from  
20 the aforementioned Examples 2-1 to 2-8 and  
Comparative examples 2-1 to 2-11; the evaluation  
results are also shown in Tables 2-1 to 2-4.

[0220]

[Table 2-1]

	Example			
	2-1	2-2	2-3	2-4
Ion-exchanged water	Balance	Balance	Balance	Balance
Glycerin	3.0	3.0	3.0	3.0
Water dispersion of polyurethane of preparation example 1	0.25 (0.05)	2.5 (0.5)	—	12.5 (2.5)
Water dispersion of polyurethane of preparation example 2	0.25 (0.05)	2.5 (0.5)	10.0 (2.0)	5.0 (1.0)
Swollen form of non-emulsifying cross-linked silicone (Note 1)	—	40.0 (5.0)	—	24.0 (3.0)
Swollen form of non-emulsifying cross-linked silicone (Note 2)	20.0 (1.0)	—	5.0 (0.25)	—
Dimethyl silicone (20 mPa·s)	1.0	1.0	1.0	1.0
Sorbitan polyoxyethylene (10) monooleate (Note 6)	0.5	0.5	0.5	0.5
Water dispersion of cross-linked sodium poly- $\gamma$ -glutamate (Note 8)	30.0 (0.6)	30.0 (0.6)	30.0 (0.6)	30.0 (0.6)
Paraben	0.15	0.15	0.15	0.15
Total	100	100	100	100
Wrinkle reduction effect right after application	○	◎	○	◎
Wrinkle reduction effect five hours after application	○	○	○	◎
Peeling	○	◎	◎	◎
Glossiness	○	◎	◎	◎
No stickiness	○	◎	◎	◎
No discomfort	○	◎	◎	○

(Numbers in parentheses indicate the solid content.)

[0221]

[Table 2-2]

	Example			
	2-5	2-6	2-7	2-8
Ion-exchanged water	Balance	Balance	Balance	Balance
Glycerin	3.0	3.0	3.0	3.0
Water dispersion of polyurethane of preparation example 1	25.0 (5.0)	35.0 (7.0)	20.0 (4.0)	30.0 (6.0)
Water dispersion of polyurethane of preparation example 2	—	—	20.0 (4.0)	20.0 (4.0)
Swollen form of non-emulsifying cross-linked silicone (Note 1)	10.0 (1.25)	—	—	40.0 (5.0)
Swollen form of non-emulsifying cross-linked silicone (Note 2)	—	30.0 (1.5)	20.0 (1.0)	—
Dimethyl silicone (20 mPa·s)	1.0	1.0	1.0	1.0
Sorbitan polyoxyethylene (10) monooleate (Note 6)	0.5	0.5	0.5	0.5
Water dispersion of cross-linked sodium poly- $\gamma$ -glutamate (Note 8)	30.0 (0.6)	30.0 (0.6)	30.0 (0.6)	30.0 (0.6)
Paraben	0.15	0.15	0.15	0.15
Total	100	100	100	100
Wrinkle reduction effect right after application	◎	◎	◎	◎
Wrinkle reduction effect five hours after application	○	○	○	◎
Peeling	◎	◎	◎	○
Glossiness	◎	◎	◎	○
No stickiness	◎	◎	◎	○
No discomfort	○	○	○	○

(Numbers in parentheses indicate the solid content.)

[0222]

[Table 2-3]

	Comparative example					
	2-1	2-2	2-3	2-4	2-5	2-6
Ion-exchanged water	Balance	Balance	Balance	Balance	Balance	Balance
Glycerin	3.0	3.0	3.0	3.0	3.0	3.0
Water dispersion of polyurethane of preparation example 1	2.5 (0.5)	20.0 (4.0)	-	-	-	35.0 (7.0)
Water dispersion of polyurethane of preparation example 2	2.5 (0.5)	20.0 (4.0)	-	-	-	-
Swollen form of non-emulsifying cross-linked silicone (Note 1)	-	-	10.0 (1.25)	-	40.0 (5.0)	-
Dimethyl silicone (20 mPa·s)	1.0	1.0	1.0	1.0	1.0	1.0
Sorbitan polyoxyethylene (10) monooleate (Note 6)	0.5	0.5	0.5	0.5	0.5	0.5
Water dispersion of cross-linked sodium poly- $\gamma$ -glutamate (Note 8)	30.0 (0.6)	30.0 (0.6)	30.0 (0.6)	30.0 (0.6)	30.0 (0.6)	30.0 (0.6)
Paraben	0.15	0.15	0.15	0.15	0.15	0.15
Total	100	100	100	100	100	100
Wrinkle reduction effect right after application	×	○	△	×	○	○
Wrinkle reduction effect five hours after application	×	○	△	×	○	△
Peeling	×	×	○	×	×	×
Glossiness	△	×	△	◎	◎	△
No stickiness	○	×	×	◎	×	×
No discomfort	○	×	○	×	△	×

(Numbers in parentheses indicate the solid content.)

[0223]

[Table 2-4]

	Comparative example				
	2-7	2-8	2-9	2-10	2-11
Ion-exchanged water	Balance	Balance	Balance	Balance	Balance
Glycerin	3.0	3.0	3.0	3.0	3.0
Water dispersion of polyurethane of preparation example 1	10.0 (2.0)	—	—	—	—
Swollen form of non-emulsifying cross-linked silicone (Note 1)	—	—	40.0 (5.0)	—	—
Swollen form of non-emulsifying cross-linked silicone (Note 2)	—	—	—	10.0 (0.5)	—
Water dispersion of polyurethane (Note 3)	—	—	6.06 (2.0)	—	—
Dimethyl silicone (20 mPa·s)	—	—	—	—	10.0
Water dispersion of polyurethane (Note 4)	—	—	—	25.0 (5.0)	—
Water dispersion of polyurethane (Note 5)	—	—	—	—	15.0 (3.0)
Sorbitan polyoxyethylene (10) monooleate (Note 6)	0.5	0.5	0.5	0.5	0.5
Trimethylsiloxysilicic acid (Note 7)	5.0 (2.5)	—	—	—	—
Polyvinyl alcohol	—	3.0	—	—	—
Water dispersion of cross-linked sodium poly- $\gamma$ -glutamate (Note 8)	30.0 (0.6)	30.0 (0.6)	30.0 (0.6)	30.0 (0.6)	30.0 (0.6)
Paraben	0.15	0.15	0.15	0.15	0.15
Total	100	100	100	100	100
Wrinkle reduction effect right after application	$\Delta$	$\times$	$\times$	$\Delta$	$\Delta$
Wrinkle reduction effect five hours after application	$\times$	$\times$	$\Delta$	$\times$	$\Delta$
Peeling	$\Delta$	$\times$	$\Delta$	$\times$	$\Delta$
Glossiness	$\times$	$\bigcirc$	$\times$	$\times$	$\Delta$
No stickiness	$\bigcirc$	$\times$	$\bigcirc$	$\times$	$\times$
No discomfort	$\times$	$\odot$	$\Delta$	$\times$	$\Delta$

(Numbers in parentheses indicate the solid content.)

5 [0224]

In Tables 2-1 to 2-4:

(Note 1) DC9045 (solid content 12.5%) (from Dow Corning Toray)

(Note 2) KSG-44 (solid content approximately 5%) (from Shin-Etsu Chemical Co., Ltd.)

5 (Note 3) Avalure UR405 (solid content 33%) (from NOVEON)

(Average particle size: 100 nm, strength: 40 kg/cm<sup>2</sup>, elongation: 150%, film shrinkage rate: 35%)

10 (Note 4) Avalure UR445 (solid content 20%) (from NOVEON)

(Average particle size: 5 nm, strength: 240 kg/cm<sup>2</sup>, elongation: 610%, film shrinkage rate: 27%)

15 (Note 5) Iodosol PUD (solid content 20%) (from Nippon NSC)

(Average particle size: 20 nm, strength: 200 kg/cm<sup>2</sup>, elongation: 530%, film shrinkage rate: 23%)

20 (Note 6) NIKKOL T0-10 (from Nikko Chemicals Co.)

(Note 7) Contains KF7312J

(decamethylcyclopentasiloxane solution; effective ingredient content 50%) (from Shin-Etsu Chemical Co., Ltd.).

25 (Note 8) Gelprotein A-8001 (solid content 2 %)



(from Idemitsu Technofine Co., Ltd.)

[0225]

As clearly shown in Tables 2-1 to 2-4, the skin treatment compositions for wrinkle reduction from Examples 2-1 to 2-8 pertaining to the present invention are superior in terms of the wrinkle reduction effect and free of peeling, glossiness, stickiness, and discomfort. On the contrary, skin treatment compositions for wrinkle reduction from Comparative examples 2-1 to 2-11 which do not meet the constituent requirements of the present invention, do not manifest the effects of the present invention.

[0226]

More Examples of the skin treatment composition for wrinkle reduction of the present invention are described below. The aforementioned efficacy test was conducted on these and the results were superior for all of them.

[0227]

[Example 2-9] Skin treatment composition for wrinkle reduction (cream type)

Ingredients	Blend ratio (wt%)
(1) Stearyl alcohol	6.0
(2) Stearic acid	2.0

	(3) Hydrated lanolin	4.0
	(4) Squalane	9.0
	(5) 5-octyldodecanol	10.0
	(6) 1,3-butylene glycol	6.0
5	(7) Water dispersion of polyurethane from preparation example 1	5.0
	(solid content 1.0)	
	(8) Water dispersion of polyurethane from preparation example 2	10.0
10	(solid content 2)	
	(9) Swollen form of non-emulsifying cross-linked silicone (Note 1)	20.0
	(solid content 3.2)	
	(10) PEG 1500	4.0
15	(11) Polyoxyethylene (20) sorbitan monococoate (Note 2)	3.0
	(12) Glycerin monostearate	2.0
	(13) Ethylparaben	0.1
20	(14) Butylparaben	0.1
	(15) Tocopherol	0.01
	(16) Perfume	0.1
	(17) Purified water	Balance
	Total	100.0
25	[0228]	

(Note 1) DC9041 (solid content 16%) (from Dow Corning Toray)

(Note 2) NIKKOL TL-10 (from Nikko Chemicals Co.)  
[0229]

5 <Preparation method>

(6), (10), (13), and (14) were added to (17) and the temperature was raised and adjusted to 70°C. Next, the oil phase consisting of (1), (2), (3), (4), (5), (9), (11), (12), (15), and (16) were prepared and the temperature was adjusted to 70°C. This was added to the water phase previously prepared; a homomixer was used to homogenize the emulsified particles and (7) and (8) were added. After deaeration, filtration, and cooling, the target cream for wrinkle reduction was obtained.

[0230]

[Example 2-10] Skin treatment composition for wrinkle reduction (lotion type)

20	Ingredients	Blend ratio (wt%)
	(1) Palmitic acid	2.0
	(2) Cetyl alcohol	1.5
	(3) Petrolatum	4.0
	(4) Squalane	5.0
25	(5) Glycerol tri-2-ethylhexanoate	2.0

	(6) Sorbitan monooleate	2.0
	(7) Dipropylene glycol	5.0
	(8) PEG 1500	3.0
	(9) Water dispersion of polyurethane from	
5	preparation example 1	2.0
	(solid content 0.4)	
	(10) Water dispersion of polyurethane from	
	preparation example 2	8.0
	(solid content 1.6)	
10	(11) Swollen form of non-emulsifying cross-linked	
	silicone (Note 1)	30.0
	(solid content 1.8)	
	(12) Triethanolamine	1.0
	(13) Methylparaben	0.1
15	(14) Phenoxy ethanol	0.1
	(15) Perfume	0.1
	(16) Purified water	Balance
	Total	100.0

[0231]

20 (Note 1) GRANSIL GCM-5 (solid content  
approximately 6%) (from GRANT)

[0232]

<Preparation method>

(7), (8), (13), and (14) were added to (16)  
25 and the temperature was raised and adjusted to

70°C. The oil phase consisting of (1), (2), (3), (4), (5), (6), (11), and (15) were prepared and the temperature was adjusted to 70°C. This oil phase was added to the water phase prepared previously and pre-emulsification was carried out. Next, (12) was added; after the emulsified particles were homogenized with a homomixer, (9) and (10) were added to obtain the target lotion type for wrinkle reduction.

10 [0233]

[Example 2-11] Skin treatment composition for wrinkle reduction (cream type)

	Ingredients	Blend ratio (wt%)
	(1) Behenyl alcohol	1.0
15	(2) Batyl alcohol	2.0
	(3) Hydrated polyisobutene	4.0
	(4) Liquid petrolatum	9.0
	(5) Decamethylcyclopentasiloxane	10.0
	(6) 1,3-butylene glycol	3.0
20	(7) Glycerin	5.0
	(8) Water dispersion of polyurethane from preparation example 1	5.0
		(solid content 1.0)
	(9) Water dispersion of polyurethane from preparation example 2	10.0
25		

		(solid content 2.0)
	(10) Swollen form of non-emulsifying cross-linked silicone (Note 1)	20.0
		(solid content 3.0)
5	(11) PEG 20000	4.0
	(12) Self emulsified glycerin monostearate (Note 2)	3.0
	(13) Glycerin monostearate	2.0
	(14) Ethylparaben	0.1
10	(15) Butylparaben	0.1
	(16) Tocopherol	0.01
	(17) Perfume	0.1
	(18) Purified water	Balance
		Total 100.0

# 15 [0234]

## <Preparation method>

(6), (7), (11), (14), and (15) were added to (18) and the temperature was raised and adjusted to 70°C. Next, the oil phase consisting of (1), (2), (3), (4), (5), (10), (12), (15), (16), and (17) were prepared and the temperature was adjusted to 70°C. This was added to the water phase previously prepared; a homomixer was used to homogenize the emulsified particles and (8) and (9) were added. After deaeration, filtration, and

cooling, the target cream for wrinkle reduction was obtained.

[0235]

(Note 1) GRANSIL ININ (solid content approximately  
5 15%) (from GRANT)

(Note 2) NIKKOL MGS-ASE (from Nikko Chemicals Co.)

[0236]

[Example 2-12] Skin treatment composition for wrinkle reduction (lotion type)

10	Ingredients	Blend ratio (wt%)
	(1) Palmitic acid	2.0
	(2) Cetyl alcohol	1.5
	(3) Petrolatum	4.0
	(4) Squalane	5.0
15	(5) Glycerol tri-2-ethylhexanoate	2.0
	(6) Sorbitan monooleate	2.0
	(7) Dipropylene glycol	5.0
	(8) PEG 1500	3.0
	(9) Water dispersion of polyurethane from	
20	preparation example 1	2.0
		(solid content 0.4)
	(10) Water dispersion of polyurethane from	
	preparation example 2	8.0
		(solid content 1.6)
25	(11) Swollen form of non-emulsifying cross-linked	

silicone (Note 1)	30.0
	(solid content 1.5)
(12) Triethanolamine	1.0
(13) Methylparaben	0.1
5 (14) Phenoxy ethanol	0.1
(15) Perfume	0.1
(16) Purified water	Balance
	Total 100.0

[0237]

- 10 (Note 1) KSG-44 (solid content approximately 5%)  
(from Shin-Etsu Chemical Co., Ltd.)

[0238]

<Preparation method>

- (7), (8), (13), and (14) were added to (16)
- 15 and the temperature was raised and adjusted to  
70°C. The oil phase consisting of (1), (2), (3),  
(4), (5), (6), (11), and (15) were prepared and  
the temperature was adjusted to 70°C. This oil  
phase was added to the water phase prepared
- 20 previously and pre-emulsification was carried out.  
Next, (12) was added; after the emulsified  
particles were homogenized with a homomixer, (9)  
and (10) were added to obtain the target lotion  
type for wrinkle reduction.

25 [0239]



[Example 2-13] Skin treatment composition for  
wrinkle reduction (gel type)

	Ingredients	Blend ratio (wt%)
	(1) Copolymer of sodium polyacrylate/2-acrylamide-	
5	2-methylpropanesulfonic acid (AMPS) (Note 1)	2.1
	(effective ingredient content 0.79)	
	(2) Water dispersion of polyurethane from	
	preparation example 1	2.0
10	(solid content 0.4)	
	(3) Water dispersion of polyurethane from	
	preparation example 2	8.0
	(solid content 1.6)	
	(4) Swollen form of non-emulsifying cross-linked	
15	silicone (Note 2)	30.0
	(solid content 1.5)	
	(5) Triethanolamine	1.0
	(6) Methylparaben	0.1
	(7) Phenoxy ethanol	0.1
20	(8) Perfume	0.1
	(9) Purified water	Balance
	(10) Glycerin	5.0
	(11) 1,3-butylene glycol.	3.0
	Total	100.0
25	[0240]	

(Note 1) SIMULGE EG (effective ingredient content 37.5%) (from Sepic)

(Note 2) KSG-15 (solid content approximately 5%) (from Shin-Etsu Chemical Co., Ltd.)

5 [0241]

<Preparation method>

(1), (5), (6), (7), (10), and (11) were added to (9), to which a mixture of (4) and (8) were added and dispersed homogeneously with a homomixer. (2) and (3) were then added to obtain the target gel for wrinkle reduction.

[0242]

[Example 2-14] Skin treatment composition for wrinkle reduction (cream type)

15	Ingredients	Blend ratio (wt%)
	(1) Behenyl alcohol	2.0
	(2) Stearyl alcohol	3.0
	(3) Octyl palmitate	3.0
	(4) $\alpha$ -olefin oligomer	5.0
20	(5) Dimethylpolysiloxane (6 mPa·s)	10.0
	(6) 1,3-butylene glycol	3.0
	(7) Glycerin	5.0
	(8) Water dispersion of polyurethane from preparation example 1	5
25		(solid content 1)

	(9) Water dispersion of polyurethane from preparation example 2	10.0
		(solid content 2.0)
5	(10) Swollen form of non-emulsifying cross-linked silicone (Note 1)	20.0
		(solid content 5)
	(11) PEG 20000	4.0
	(12) Polyoxyethylene (20) sorbitan monococoate (Note 2)	
10		3.0
	(13) Glycerin monostearate	2.0
	(14) Ethylparaben	0.1
	(15) Butylparaben	0.1
	(16) Tocopherol	0.01
15	(17) Perfume	0.1
	(18) Purified water	Balance
		Total 100.0

[0243]

- (Note 1) KSG-16 (solid content approximately 25%)  
20 (from Shin-Etsu Chemical Co., Ltd.)  
(Note 2) NIKKOL TL-10 (from Nikko Chemicals Co.)

[0244]

<Preparation method>

- (6), (7), (11), (14), and (15) were added to  
25 (18) and the temperature was raised and adjusted

to 70°C. Next, the oil phase consisting of (1), (2), (3), (4), (5), (10), (12), (15), (16), and (17) were prepared and the temperature was adjusted to 70°C. This was added to the water phase previously prepared; a homomixer was used to homogenize the emulsified particles and (8) and (9) were added. After deaeration, filtration, and cooling, the target cream for wrinkle reduction was obtained.

10